

REPORT  
OF THE  
ENGINEERS VALUATION BOARD  
IN RE  
PITTSBURGH RAILWAYS COMPANY

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SUBMITTED TO  
THE PUBLIC SERVICE COMMISSION  
OF THE  
COMMONWEALTH OF PENNSYLVANIA  
AUGUST 1919.



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Pittsburgh Railways Company

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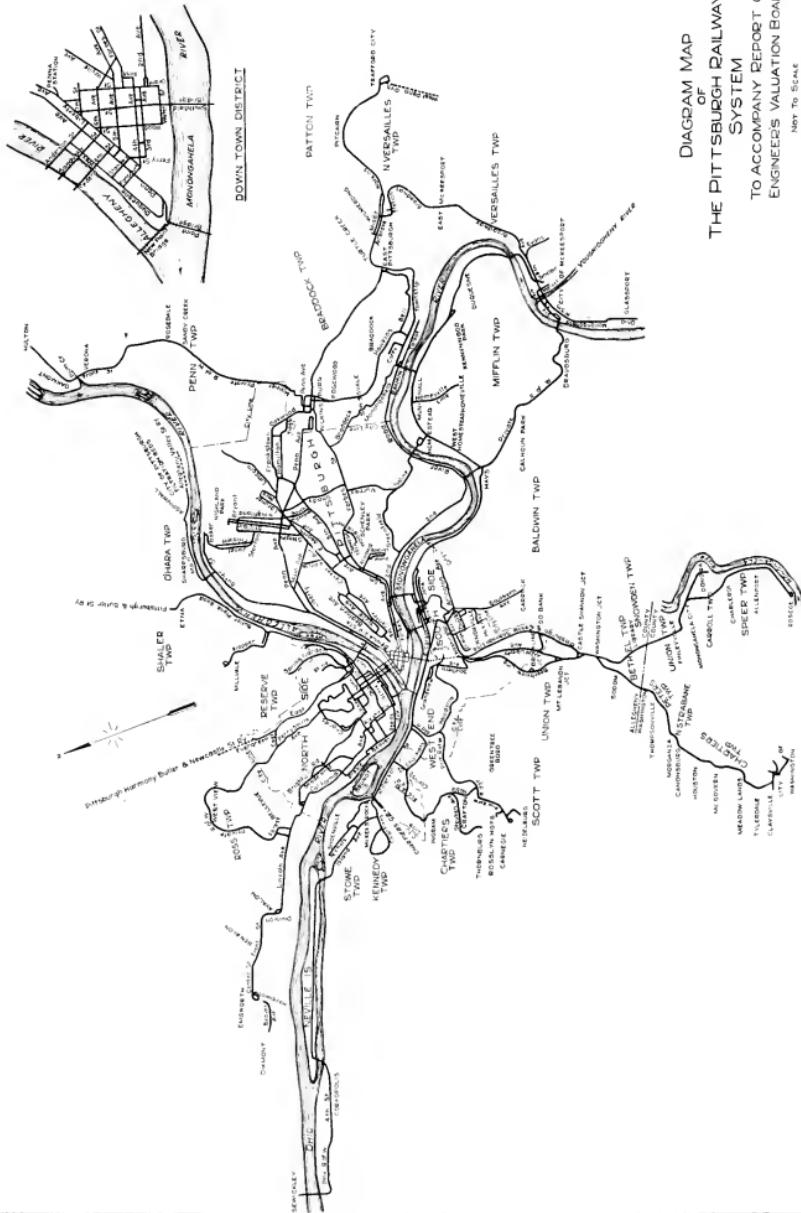
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## Letter of Transmittal

### SUMMARY OF REPORT.

TO THE PUBLIC SERVICE COMMISSION  
OF THE COMMONWEALTH OF PENNSYLVANIA,  
HONORABLE WM. D. B. AINEY, Chairman,  
Harrisburg, Pennsylvania.

SIRS:—

#### In Re: Complaint Dockets No. 1827 1917, and No. 1571 1917.

In conformity with an agreement between the City of Pittsburgh, certain other municipalities, individuals and associations, complainants, parties thereto, of the one part, and the Pittsburgh Railways Company and certain of its affiliated, associated or underlying railway companies, parties of the other part, this Board was appointed:

“to assist the Public Service Commission in arriving at conclusions upon the questions which may properly arise in a hearing to determine the value of the property for rate making purposes and reasonable return thereon, and the reasonable rates of fare to be charged by the Pittsburgh Railways Company.”

The Board was further charged to consider and report to the Commission its findings: “as to the cost of operation, proper charges for maintenance, renewals and replacements, improvements and betterments, reserve fund for depreciation, obsolescence, working capital, and any other expenses or charges which are properly to be charged against the income as bearing upon the matter of rates of fare.”

It was prescribed that:

“An inventory of all the property of the Pittsburgh Railways Company and of any affiliated, associated or underlying railway company shall be made by the Pittsburgh Railways Company, and the Railways Company shall attempt to prepare a statement of the original and historical cost of the different properties as a whole and as underlying systems, under the direct supervision of the Board.”

The Board organized on March 15th, 1918, and the Pittsburgh Railways Company began immediately, under the direction of Messrs. Ford, Bacon and Davis, to prepare the inventory and statement of original and historical cost as stipulated. This work has now been completed under instructions laid down by the Board, and was checked while in progress and after completion by the City's representatives on this Board.

With the purpose of providing those measures of value specified in the Public Service Company Law, the Board has had prepared a statement of the historical cost as determined from the records, and estimates of the reproduction costs of the physical property based upon several interpretations of the fair average price of materials, property and labor.

We find the cost of the physical property as determined from the records and if reproduced upon the various bases of pricing, to be as follows:

Basis No. 1—Historical cost as determined from the records, with scrutiny of engineers and accountants, representing actual investment in physical property placed in the service of the public.....	\$59,069,382
Basis No. 2—Estimated cost of reproduction new at prices ruling when each part of the existing property was constructed and under original conditions of construction.....	\$49,324,791
Basis No. 3A—Estimated cost of reproduction new at average prices of the period 1906 to 1915, inc., and under original conditions of construction.....	\$56,148,398
Basis No. 3B—Estimated cost of reproduction new at prices indicated for 1918 by the trend of prices for 20 years previous to 1916, and under original conditions of construction.....	\$60,832,200

Basis No. 3C—Estimated cost of reproduction new at average prices of the period 1914 to 1918, inc., and under original conditions of construction.....	\$73,560,300
Basis No. 3D—Estimated cost of reproduction new at the estimated average prices of the period from 1918 to 1922, inc., and under original conditions of construction.....	\$84,191,300
Basis No. 4—Estimated cost of reproduction new at prices and under the conditions ruling at the date of valuation, viz., April 1, 1918 .....	\$102,842,274

These figures include real estate and rights of way; organization and development cost prior to construction; engineering, legal and administrative expenses; interest and taxes during construction; cost of financing; materials and supplies and working capital necessary for operation.

Under the terms of a contract entered into on December 31, 1913, the Pittsburgh Railways Company agreed to sell its principal power generating plants to the Duquesne Light Company. While the actual transfer of title to all of these power plants has not taken place, they are not considered to be a part of the property of the Pittsburgh Railways System as valued for rate making purposes.

The historical cost as found includes superseded property in the following amounts:

Horse Car System.....	\$ 1,542,178
Cable System.....	3,778,639
Early Electric Equipment and Construction.....	5,950,641
Total.....	\$11,271,458

A large portion of this property was superseded when in good operating condition and in particular the cable systems were in operation for only seven years.

We find the accrued depreciation of parts of the physical property as of April 1st, 1918, to have been as follows:

Prices used in

Basis No. 2.....	\$12,039,600
Basis No. 3A.....	12,733,100
Basis No. 3B.....	13,869,700
Basis No. 3C.....	16,845,200
Basis No. 3D.....	19,364,000
Basis No. 4.....	23,775,500

These estimates are based upon detailed inspection of condition with consideration of elapsed and of estimated remaining life. They include such overhead charges as enter into the cost of replacements.

The Board was unable to agree as to Development Value, Going Concern Value and Other Elements of Value.

The Board has made no allowances for:

1. Franchise Values in excess of cost.
2. Special charter of the Pittsburgh Railways Company.
3. Earning Capacity.
4. Terminal rights or facilities.
5. Bridge rights in excess of cost.

Owing to recent business and financial conditions this Board has been unable to make a satisfactory estimate of the market value of the bonds and stock outstanding against the property as of April 1, 1918.

In calculating for fares in the immediate future, there should be added to the rate base as of April 1, 1918, the following expenditures made since April 1, 1918:

1. Increase in capital account, April 1, 1918, to June 30, 1919	\$292,726
2. Cost of betterments made from April 1, 1918, to July 31, 1919, in excess of estimated cost of construction and equipment replaced	53,027
Total, . . . . .	\$345,753

To this should be added additional expenditures on the same account made from July 1, 1919, to the date upon which the fare system is approved.

We have made careful detailed estimates of the amounts that will be required for the calendar year 1920 for cost of operation, maintenance, renewals, replacements, improvements and betterments and reserve fund for depreciation and obsolescence.

These estimates are summarized as follows:

#### ESTIMATED OPERATING EXPENSES AND TAXES FOR 1920

Maintenance and Renewals of Way and Structures . . . . .	\$ 2,238,000
Maintenance and Renewals of Equipment . . . . .	1,943,000
Traffic . . . . .	30,000
Power . . . . .	1,900,000
Conduction of Transportation . . . . .	5,431,000
Injuries and Damages . . . . .	855,000
General and Miscellaneous Expense . . . . .	950,000
Operation and Maintenance of Inclines . . . . .	97,000
Operation and Maintenance of Toll Bridges . . . . .	42,000
Total Operating Expenses . . . . .	\$13,486,000
Taxes . . . . .	600,000
Total Operating Expenses and Taxes . . . . .	\$14,086,000

The members of this Board failed to reach an agreement as to a rate base and as to rate of return to be reported for the consideration of the Commission. Consequently, Robert M. Feustel and George W. Fuller, these members representing the complainants, have prepared a separate statement; and J. A. Emery and Morris Knowles, representing the respondents, have also prepared a separate statement, both of which are herewith transmitted and made a part of the report of the Board to the Public Service Commission.

The conclusions of Messrs. Feustel and Fuller are:

Considering all of the data recorded or referred to in the minutes of the proceedings of the Board, or contained in this report and all of the elements of value, Messrs. Feustel and Fuller are of the opinion that the fair value of the property of the Pittsburgh Railways System for a rate base is \$48,000,000; and that the present reasonable annual revenue requirements are the sum of \$14,086,000, which has been agreed upon by the Board, as covering operating expenses and taxes, plus \$3,360,000 or a total of \$17,446,000.

The conclusions of Messrs. Emery and Knowles are:

Considering all of the data recorded or referred to in the minutes of the proceedings of the Board, or contained in this report and all of the elements of value, Messrs. Emery and Knowles are of the opinion that the fair value of the property of the Pittsburgh Railways System for a rate base is between \$65,000,000 and \$70,000,000; and that present reasonable annual revenue requirements are the sum of \$14,086,000, which has been agreed upon by the Board, as covering operating expenses and taxes, plus \$4,900,000, or a total of \$18,986,000.

The procedure of this Board together with its methods of preparing and pricing the inventory and its consideration and treatment of the collateral questions presented to it are described in detail in text, statements, maps, and appendices of the report, which we hand you herewith. Also accompanying this report and made a part thereof are the complete minutes of the transactions of the Board with all exhibits and data used by it in arriving at its conclusions.

Pittsburgh, Pa., August 6, 1919.

ROBERT M. FEUSTEL  
GEORGE W. FULLER  
J. A. EMERY  
MORRIS KNOWLES  
F. HERBERT SNOW, Chairman.

The Chairman has affixed his signature to the report, as a member of the Engineers Valuation Board and the Chairman thereof, with the distinct understanding and stipulation that his signature to said report does not and shall not be construed as limiting him in any way in the subsequent pursuance of his duties as Chief Engineer of the Public Service Commission.

## General Description of the Property

The Pittsburgh Railways system embraces 600.2 miles—single track measurement. Of the mileage 441.9 is paved, 124.5 not paved, 26.2 in carhouses, 1.9 steam track and 2.7 is on inclines. There are 69.5 miles of private right of way owned by the Company. All track is 5'2 $\frac{1}{2}$ " gage except that on inclines and the narrow gage steam track.

The topography of the territory served is rugged with the result that the tracks have an unusually large number of curves and severe grades.

The extent of the system and the location of its several lines and the communities served are shown on the maps accompanying this report.

The rolling stock comprises a total of 1861 cars consisting of 1630 passenger, 10 freight and express, and 229 service cars. Of the passenger cars, 953 are double truck, 758 motor and 195 trailers—of which total 628 have steel or semi-steel bodies. The remaining passenger cars are single truck—404 closed cars and 273 open cars.

There are used in the operation of the system, 33 carhouses, 9 shop buildings and 53 miscellaneous buildings and structures.

The company owns 167 bridges and has borne a portion of the cost of 32 additional bridges. The Mt. Washington tunnel, owned by the Company, is 3500 feet long.

The electrical energy used in the operation of the system is purchased from the Duquesne Light Company. This power is delivered at 15 substations owned by the Company.

### General Operating Statistics

During the calendar year 1918 the Company operated 33,573,578 car miles and 4,209,989 car hours, carried 264,232,927 passengers plus 2,372,070 passengers on inclines, and purchased 173,500,078 kilowatt hours from the Duquesne Light Company.

## Summary of Historic Cost of Property

### Physical Property

The present Pittsburgh Railways system is made up of properties, rights and franchises originally acquired by some 200 separate companies. The Board has made a study of the history of the formation of all of these early companies and of their operation as far as records were available. Use was made of minute books of the underlying companies, books of account, annual reports made to State authorities, court decisions and records, foreclosure records, deed and mortgage records, construction note books and every other available source of history of the formation and operation of these companies.

In making this investigation the Board was fully aware of the fact that the complete records could not be obtained and that often where records were available the exact nature of some transactions was not apparent. It was believed, however, that such records as were available, supplemented by careful estimates where necessary, would produce figures which would be of material help in the solution of this problem.

There are diverse opinions held by those interested in public utility operation and regulation as to the value and applicability of the results obtained from historical study calculations. These opinions range from the view that only the actual cash invested in property now in use with complete deduction for all depreciation on the property is of importance, to the idea that all cash and services resulting in the issuance of securities are the determining factors. It is obvious, while the name "Historic Cost" is used, that judgment must play a large part in making deductions from these historical facts, both in the way of filling the gaps in the record and interpreting the actual recorded transactions.

The Chairman of this Board, representing the Public Service Commission, has prepared a careful statement of the history of each of the individual companies and will present this review in detail, for the use of said Commission.

The principal effort of this Board was to determine historical facts which would permit of a record being made of the total fair amount of actual money invested in the service of the Public by the impersonal investor over the entire period.

The study began with the earliest horse car line built in 1859 and was carried through for cable lines, inclines, early electrifications of horse car lines, some steam operation, rack operation on heavy grades, experimentation with underground trolley lines, the combining of sectional groups of electric lines, down through the years to the modern development of the present unified six hundred mile system. The corporate organization and inter-relation of these properties, with dates of incorporation and of consolidation, are shown in graphic form on Charts A, B and C. A statement setting forth the security issues of these companies is also presented and shown in Table I. This table and the three charts, together with maps showing the location of the various underlying companies, appear at the end of this report.

The first determination was that of plant account year by year, and this account was taken to mean the money actually invested in structural equipment with a fair allowance for the construction overhead charges, working capital and organization expenses. A book account might show a certain sum for plant account as the initial entry; if from the reports made to State authorities, construction records of the company or other sources, information was found to show that this figure was too high for the construction costs and that it may have included cash or stock payments to promoters or organizers, the amount was accordingly reduced.

Many clear records of course were available, and these, showing a cost per mile for construction, were used as an added check in obscure cases for similar construction during the same period. If a property was sold at foreclosure sale, no attention was paid to the sale price; but the actual investment in property sold was carried into plant account. Where one road was purchased by another and the first road was purchased at a price in excess of the apparent cost of physical property

and new securities issued, only the fair cost of the physical property brought in was carried into the consolidated plant account. Where companies had been organized and obtained franchise grants and were later purchased for the use that the franchises might be to the purchasing company, only the actual or fair estimated cost of obtaining the franchises was carried into the new plant account.

Representatives of the City and of the Public Service Commission sat in conference with the Company's representatives in making up this plant account. With transactions involving some two hundred companies, it was natural that there would be some differences of opinion as to just how much should be included in plant account for certain items. With the end in view, however, of determining the fair cumulative capital investment in physical property only over the entire period, it was possible to reach a range of totals for the historical plant account to which the entire Board agreed. This range was from \$58,000,000 to \$62,000,000.

In the case of change from horse car lines to electric, or any other changes in which equipment or land was sold, the money received was deducted from plant account. The total figure arrived at, therefore, represents the cumulative investment in physical property with the structural overheads and working capital for all the horse car, cable and electric lines, up to April 1, 1918. The figures does not include, however, cash or securities paid for promoters' services, for payments in excess of cost of physical property of lines bought on an earnings basis nor for land above the fair cost of that actually used for right of way by lines connected with land development schemes. For these latter items the engineers for the Company have presented the following summary:

Cash.....	8,7796,872
Bonds.....	1,402,000
Total.....	812,198,872

In addition to the above there were also large payments in stock for the same purpose.

The record of the transactions covering these amounts appears in the historical study now being arranged for presentation by the chairman of this Board.

#### Historical Return on Investment

For the purpose of determining the average return received on the investment over the entire period, it was necessary to analyze operating revenues and expenses in order to find the net amount available for return on the investment. Here again the exercise of judgment was necessary. The actual operating expenses and taxes only were deducted from gross revenues; and rentals, interest on unfunded debt, bond interest, guaranteed stock dividend payments and all like payments were considered as items to be taken out of the return available on the investment. In this way the necessity of passing on the fairness of rentals and the reasons for use of unfunded borrowed money was obviated as it was considered that the plant account for the year contained the fair investment in physical property and a sufficient amount of working capital. In these calculations no consideration was given to a depreciation allowance, either in plant account or in operating expense, since with few exceptions no depreciation accounts were kept.

Several sets of calculations were made showing the surplus deficit on different assumed rates of return. These calculations were made using both compounding and non-compounding methods of carrying forward the surpluses and deficits. The plant account used for the actual calculations was the one which amounted to \$59,069,382 in 1918. The results of the calculations at the different rates of return are as follows:

6% Non-compounded.....	\$12,617,044 Surplus
7% Non-compounded.....	\$ 1,204,714 Surplus
8% Non-compounded.....	\$10,726,778 Deficit
Varying Rates—Non-compounded.....	\$10,246,861 Deficit
6% Compounded.....	\$41,526,429 Surplus
7% Compounded.....	\$23,573,301 Surplus
8% Compounded.....	\$ 5,987,438 Deficit
Varying Rates Compounded.....	\$32,414,487 Deficit

The average rates of return earned over the entire period was 7.1%.

During the historical period of development, construction and equipment was retired from use in the following estimated amounts:

Horse Car Lines.....	.....	.....	\$ 1,542,178
Cable Lines.....	.....	.....	3,778,639
Early Electric Lines.....	.....	.....	5,950,641
Total.....	.....	.....	\$11,271,458

Much of this property was superseded well before the end of its useful life. By the method of calculation used, in which both property account and surplus or deficit account are carried forward together, it makes no difference, if the surpluses or deficits are compounded from year to year, whether the retirements are carried in one account or the other, for if they be deducted from property, a corresponding charge must be made to operating expenses, and the surplus thereby decreased or the deficit increased.

#### **Missing Historical Data as to Income Accounts**

For a considerable number of companies, income accounts for their early years of operation were not found. The surpluses and deficits from operation as calculated are therefore incomplete to this extent.

## Estimated Cost of Reproduction

### VARIOUS BASES OF COST USED

It was decided by this Board to secure as fundamental data seven bases of cost of the property.

**Basis No. 1 (Historic)** deals with the total cost of creating and developing the properties and business of the Pittsburgh Railways Company and its underlying companies as determined by statements prepared from books and records, supplemented by estimates where necessary.

The remaining bases deal with the estimated costs of reproduction new of the existing physical property as determined by the application to the inventoried property as of April 1st, 1918, of prices fixed for each of the several bases, as follows:

**Basis No. 2 (Original Prices)** makes use of prices current during the year in which each portion of the construction was done or equipment installed.

**Basis No. 3A (Average 1906 to 1915)** makes use of arithmetical averages of the prices paid from 1906 to 1915, inclusive.

**Basis No. 3B (1918 at 20 Year Trend)** makes use of prices indicated for 1918 by the trend of prices for 20 years previous to 1916.

**Basis No. 3C (Average 1914 to 1918)** makes use of arithmetical averages of prices from 1914 to 1918, inclusive.

**Basis No. 3D (Average 1918 to 1922)** makes use of arithmetical averages of actual prices for 1918 and 1919, and of estimated prices for 1920, 1921 and 1922.

**Basis No. 4 (Current)** makes use of prices current at the date of inventory, April 1, 1918.

### PRICED INVENTORY OF CONSTRUCTION AND EQUIPMENT

#### Preparation of Inventory

The quantities arrived at in the inventory reflect the work done under the physical conditions that prevailed when the existing lines were constructed. Where subsequent work was done that increased these original quantities, such as grading work incidental to change of grade, or expenditures incidental to the abolition of steam railroad crossings, such additional quantities were added to the original quantities. The inventory quantities were classified according to the "Uniform System of Accounts for Electric Railways," prescribed by the Interstate Commerce Commission; and for each account or item the same quantities were used for each of the six bases for the estimates of cost of reproduction.

Company data, so far as available, were secured and used as the basis of the inventory after checking. These included:

- (1) Track maps showing distances between points on the system, rail data and the location and types of paving.
- (2) Layouts of special track work showing all data except type of paving.
- (3) A list of locations where grading, other than trenching, was done by track forces or paid for by the Company.
- (4) Profiles and cross-sections of original ground and finished cuts or fills.
- (5) Location lists of drains, culverts, trestles and bridges, together with small sketch drawings of bridges, and a statement of ownership in whole or in part.
- (6) Plans of buildings.
- (7) Location list of substations with statement of joint ownership with the Duquesne Light Company.
- (8) Tables showing runs, lengths and sizes of feeders and transmission lines.
- (9) Inventory of telephone equipment.
- (10) List of rolling stock equipment, a tabulation by company ownership.
- (11) Inventories of shop and office equipment, spare parts, maintenance material, and material and supplies.

The above data were verified in the field, where possible. Where this could not be done, as for example, in the case of details of track construction in a paved street, the information was secured

from one or more representatives of the Company who had been connected with that particular portion of the work, supplemented by additional data from the records of the Company. Where the basic information was insufficient for the purpose of compiling the inventory satisfactorily as to quantities and condition of any structures, the field surveys showed the necessary information for record. Details of methods followed are stated in Exhibit X-19.

### **Checking of Inventory**

Engineers for the Municipalities proceeded on the basis that if their check of representative portions of the work done by the engineers and accountants for the Company showed substantial agreements, the remaining work could be regarded as accurate. Checking was done on sections selected at random, the amounts running from 10.3% for earthwork, to 14% of track, 18% of special track, 23% of overhead construction, 35% of substation equipment, 50% of service cars and 100% of passenger cars.

All paving done for or by the companies was inventoried by City forces after noting the franchise requirements in this regard, and 29% of the inventoried quantities was checked by the representatives of the Company.

The checking was reasonably carried out for all the steps from the original field work through all the calculations, testing and application of prices, extension of same and drawing off of final summaries. Details of Methods of Checking are Described in Exhibit C-5.

As a result of the work of about 70 men for a period of more than six months, the Board records full agreement on the inventory among the representatives of all parties in interest.

### **Allowances for Omissions, Incidentals and Contingencies**

This Board decided that for each group of structures and equipment, due recognition should be given to probable omissions from inventory and to unavoidable construction wastages, and losses and contingencies as actual experience shows them to be encountered under the customary methods of construction followed by capable engineers.

At the same time this Board decided to give no consideration in the "Structural Overhead Costs" to the items herein described, in conformity with the Interstate Commerce Commission classification which provides no separate account for omissions or contingencies. Full justice in the premises was done by the Board in its decision to make allowances in the inventory for omissions and contingencies, as follows:

**No Allowance:** special work; trolley wire supports; poles and fixtures; electric equipment of cars.

**$1\frac{1}{2}$  of 1% Allowance:** rails—cuts, loss and wastage for suburban work; all cars except service equipment—to cover attachments only (a).

**1% Allowance:** rails—cuts, loss and wastage for city work; tie rods and rail braces—loss and wastage; service equipment (a).

**$1\frac{1}{2}\%$  Allowance:** ties—excess ties at joints.

**2% Allowance:** field rivets (where manufacturer's shipping weights of steel were used); paving.

**3% Allowance:** joints and bonds—open track; substation equipment—Incomplete inventory; shop equipment—Incomplete inventory.

**4% Allowance:** feeders and transmission system—Incomplete inventory, construction loss and wastage.

**5% Allowance:** joints—city track; signals—Incomplete inventory (a); telephone and telegraph lines—Incomplete inventory; underground conduits—loss and wastage; furniture; miscellaneous equipment—Incomplete inventory; electric equipment of cars—Incomplete inventory of spare parts only (a); track spikes; bonds—city track.

**6% Allowance:** ballast open track—compacting, loss and wastage.

**10% Allowance:** grading outer city for shrinkage and incomplete inventory; pipe culverts—complete inventory; roadway machinery and tools; farm crossings.

**15% Allowance:** fences and signs incomplete inventory (a).

NOTE:—(a) Percentage to be added to costs and not to quantities.

In small buildings and timber bridges the allowances for construction wastage were provided for in the unit prices.

### Derivation and Application of Unit Prices

In developing unit prices to apply to the inventory under the bases enumerated the Board requested the Company to furnish by calendar years from 1889 to 1918 inclusive:

(1) An analysis of quantities and prices of the purchases of rails, ties, wire, poles, paving block, ballast, brick, cars, car equipment and special track.

(2) Labor cost data and any other relevant information for excavation, hauling, store-room costs, track laying, paving and pole setting.

(3) Studies of pay-rolls of July and January of each year to disclose the average rate of wages for common labor, pavers, track foremen, linemen and groundmen.

These data could not be satisfactorily developed for years earlier than 1902, because previous to that time sufficient records were not available.

Unit prices did not enter into Basis No. 1 (Historic Cost).

For Basis No. 2 (Original Cost) the records of the Company were searched for data on costs of all complete units. Where a piece of work had not been changed or remodelled the complete cost from the records was used. In many cases, for such items as buildings, bridges, track structures and to a certain extent rolling stock, the original cost does not apply to the inventoried property on account of property changes. In other cases, the book entries do not clearly show the exact amount of work done. In both such contingencies, engineering analyses and judgment were applied by representatives of the Company to the records to derive the cost in place of the inventoried property and these were used after satisfactory checks were made for the City.

For some items the price prevalent at the time of construction was applied. For others which contained a multiplicity of small items and kinds of material, making it physically impossible to devise separate costs for each year of the items concerned, it was necessary to resort to weighted average prices covering the entire range of years during which such items were erected. By adopting this method the progress of the work was hastened, and the total result is the same as it would have been had each item of construction been priced according to the cost prevailing as and when constructed.

For Basis No. 3A (Average 1906 to 1915) the inventory was priced according to the arithmetical average of the prices of material and labor prevalent during the years 1906 to 1915, inclusive, as obtained, wherever possible, from the vouchers and records of the Company. In certain cases prices were checked by conferences with representatives of the manufacturers. All prices were carefully reviewed at conferences between representatives of all interested parties before being finally agreed upon and accepted by this Board.

To the bare prices of material, f.o.b. Pittsburgh, were added such elements of cost as are usually incurred for each kind of material, as follows:

- (1) Inspection of material at the point of manufacture or elsewhere.
- (2) Demurrage charges.
- (3) Unloading material from cars and piling in storeyard.
- (4) Occasional accidental breakage in unloading or in the storeyard.
- (5) Watchmen.

It was impossible to obtain any definite information from the records of the Company as to these miscellaneous cost elements, and they were, therefore, estimated from information and exper-

ience obtained on other appraisals and construction work. The allowances in unit prices for the above incidentals and contingencies were applied to all bases of estimated cost of reproduction.

For Basis No. 3B (1918 at 20 Year Trend) the inventory was priced by applying a percentage increase to Basis No. 3A (Average 1906 to 1915). To obtain this percentage, the yearly fluctuation of prices paid by the Company was studied for the principal commodities entering into the property; and the percentage so used is a weighted average figure derived from the yearly prices which were obtained for use under Basis No. 2 (Original Cost). By charts, tables, etc., the individual yearly price fluctuations were weighted and combined to obtain the total increased or decreased figure and thus form a street-railway index chart. This chart shows a general upward trend of prices until the sharp peak—starting late in 1915—due to the World War. Ignoring the war peak the general trend line was extended to 1918 from which was obtained the index for the year, thereby deriving the percentage (10.0) increase to the average prices of 1906 to 1915, inclusive.

For Basis No. 3C (Average 1914 to 1918) the inventory was priced by applying a percentage increase to Basis No. 3A (Average 1906 to 1915). The percentage (33.3) used is the arithmetical average of the yearly indices for the period 1914 to 1918 shown on index curve described under Basis No. 3B.

For Basis No. 3D (Average 1918 to 1922) the inventory was priced by applying a percentage increase to Basis No. 3A (Average 1906 to 1915). The percentage (55.0) used is a weighted average figure determined for the years 1918 and 1919 as explained below for Basis No. 4 (Current Cost) together with a thorough study of the probable trend of prices for the years 1920, 1921 and 1922, as reflected by actual present economic conditions which will undoubtedly affect the trend of prices.

Prices for Basis No. 4 (Current Cost) were obtained, wherever possible, from the vouchers and records of the Company, together with prices established by the United States Government, quotations secured by the purchasing agent of the Company and such information as could be reliably obtained from engineering and contracting journals, dealers, local contractors and general information reflecting the opinions of persons conversant with the price situation. To arrive at the cost of labor, a comparison was made between the costs of gangs during 1906 to 1915 at the hourly wage prices actually paid by the Company and the cost of the same gang at the actual hourly wage prices paid by the Company on April 1st, 1918. The percentage obtained in this way was increased to make allowance for the reduced output of labor obtainable in 1918 and the shorter working day then in vogue.

## REAL ESTATE AND RIGHT OF WAY

### Description

The inventory shows 163 parcels of real estate, comprising about 356 acres purchased in connection with the power houses, substations, car barns, shops, storage yards and other purposes, also rights of way now in use for 69.52 miles of track and amounting to 381 acres. Unsold holdings of land purchased incident to acquiring rights of way are inventoried in part with rights of way and in part as land parcels. No attempt was made to reclassify such holdings as inventoried.

In addition to the inventoried real estate, there are included 9.61 miles of rights of way actually purchased for street railway purposes, but later dedicated to the Public, although still used by the street railway in conjunction with the Public. In some cases the rights of the Public are subject to the rights of the Company, in others the reverse is true. There are also included disbursements and incidental considerations involved in securing the consent of property owners along township roads on which car lines were installed, easements over bridges, and rights of way no longer used.

### No Eminent Domain

The land and rights of way were acquired without the right of eminent domain, and it was assumed that this same situation would obtain in arriving at the prices for use in estimates of cost of reproduction. This latter assumption is based on the practical absence of the right of condemnation by the Pittsburgh Railways Company and its underlying companies, except the Castle Shannon subsidiary.

### No Overhead Allowances

All figures for real estate and rights of way are recorded as purchase prices, without any allowances for overhead charges, which are separately considered.

### Buildings

Where there are buildings on the real estate, which were not included in the inventory of structures, equipment, etc., the same have been included in the real estate figures. Such buildings have been appraised by the real estate appraisers with checks of the more important ones made by the engineers. Under Basis No. 2, where the buildings were erected subsequent to the original purchase, the cost of these buildings has been estimated by the engineers.

### Rights of Way Dedicated to Public

In acquiring the rights of way, it is found that substantial portions of the purchases referred to conditions wherein the strips of land now used as rights of way have been dedicated to the Public after purchase. Such rights of way do not appear in the inventory list, as they are neither held in fee, nor have the companies an easement on record for them, except in a few cases. These rights of way and record cost of same, as checked by this Board, are recorded in Table No. II, and are used on Bases No. 2, 3 and 4; the amount is \$335,656.44.

### Rights of Way Abandoned

Certain rights of way were at one time used, but are now abandoned. The net cost, which is \$37,183.26, represents the difference between the cost of acquiring and receipts from re-sale. This amount has been checked and used in Bases No. 2, 3 and 4, and is shown in Table No. II.

### Consents of Property Owners

It was necessary to obtain the consents of the adjoining property owners along township roads before constructing the street railways. This involved substantial disbursements, either as cash consideration or contingent construction work insisted upon by the property owners. These disbursements, as reported to the Board, do not appear in the inventory, but were checked by it and are listed under Table No. II, and used in Bases No. 2, 3 and 4; the amount is \$82,000.26. The records of the Company are not complete in this respect, as no record of consents was found for a considerable mileage.

### Easements Over Bridges

In two cases it was necessary, where the Company did not own a bridge, to pay for the easement over the bridge. The actual fees paid amounted to \$23,000, which sum was checked and used in Bases No. 2, 3 and 4.

### Actual Cost (Basis No. 2)

The costs of the real estate holdings as inventoried were secured from the County Recorder's office in cases where the considerations involved are on record. In part they were obtained from the records of the Company. The actual cost of the 163 parcels of real estate was found to be \$2,311,534.41, and of the 69.52 miles of rights of way was \$484,346.34, and the amount for rights of way abandoned and those dedicated to the public for consents and easements was \$477,839.96. The total of all these costs is \$3,273,720.71. These costs were adopted by the Board for use in reproduction cost on Basis No. 2.

### Estimated Prices for Basis No. 3

The data presented by the real estate appraisers (referred to below) and additional information on sales of property during the past ten years, in the vicinity of the parcels under consideration, were taken into account by the Board in agreeing upon prices for use in the estimate of reproduction cost on Basis No. 3. These prices exclude the effect of temporary war conditions on manufacturing sites and on values incident to emergency needs associated with military activities. They include no increment for railway service, but were based on neighborhood land values, taking into consideration the use to which each parcel could be put, aside from railway service. Such increments of value as were agreed upon over and above original cost, reflect the increase generally applicable to the neighborhood in question. Upon this basis, the estimated cost of the 163 parcels of real estate on Basis No. 3 amounted to \$4,542,072.00, and that of the 69.52 miles of rights of way to \$1,406,250.00, to which has been added \$477,839.96, for (1) abandoned rights of way, (2) consents on township roads, (3) rights of way dedicated to public use, and (4) easements over bridges making a total of \$6,426,161.96.

### Estimated Prices for Basis No. 4

Three local real estate men were engaged to report upon the estimated cost of acquiring the land and rights of way as inventoried. One of these experts were selected by the Company, one by the City and the third by the other two men. They reported the estimated cost of the 163 parcels of real estate at \$6,401,268.00, and of the rights of way at \$2,322,737.00 to which was added \$477,839.96 as in Basis No. 3 above, making a total of \$9,201,844.96

The said report was considered carefully by this Board and in the light of the additional data developed in connection with Basis No. 3, as above stated, and the abnormal local conditions, due to the World War, with the result that it was decided to use the appraisers' reported figures for Basis No. 4 only, and that these figures should not be employed for Basis No. 3. The summary of the figures for all bases appears in the table below and the details are shown in Appendix No. 1 of Exhibit X-44.

TABLE No. II

	Basis No. 2	Basis No. 3	Basis No. 4
Real Estate Parcels	\$2,311,534.41	\$4,542,072.00	\$6,401,268.00
Rights of Way in fee...	484,346.34	1,406,250.00	2,322,737.00
Rights of Way dedicated to Public	335,656.44	335,656.44	335,656.44
Rights of Way abandoned	37,183.26	37,183.26	37,183.26
Consents on Townships Roads	82,000.26	82,000.26	82,000.26
Easements over Bridges	23,000.00	23,000.00	23,000.00
Total, .....	\$3,273,720.71	\$6,426,161.96	\$9,201,844.96

### Classification by Interstate Commerce Commission Accounts

All of the property has been divided among fifteen different groups, and further according to the Interstate Commerce Commission accounting classification, as indicated in Table No. III. The descriptions of the various groups are given below.

- GROUP I —Parcels completely and actively utilized by the Company. (I. C. C. 502).
- GROUP II —Parcels once actively occupied but not required at present and leased to concern other than subsidiaries. (I. C. C. 503-404).
- GROUP III —Parcels once actively occupied but not required at present and now idle. (I. C. C. 404).
- GROUP IV —Power station properties, controlled by the Duquesne Light Co. under the power contract, but not deeded. (I. C. C. 404).
- GROUP V —Parcels once a necessary part of old systems and still occupied to a limited extent, but which apparently could be disposed of without impairing operation of the railways. (I. C. C. 404-503).
- GROUP VI —Parcels acquired for improvements and extensions, but leased at present to concerns other than subsidiaries. (I. C. C. 404-502-503).
- GROUP VII —Parcels acquired for improvements and extensions and lying idle at present. (I. C. C. 502-503).
- GROUP VIII—Private rights of way held in fee. (I. C. C. 502).
- GROUP IX —Rights of way originally held in fee but later dedicated to the public. (I. C. C. 502-404).
- GROUP X —Parcels held in fee and occupied as isolated private rights of way for bridges or tracks, but not included in lists of rights of way. (I. C. C. 502).
- GROUP XI —Remnants from right of way purchases, necessarily acquired in fee through lack of powers of eminent domain; not yet sold by virtue of odd shape or size or lack of development of the locality. (I. C. C. 502).
- GROUP XII —Remnants from right of way purchases in fee, necessarily acquired through lack of eminent domain; apparently saleable for development like the rest of the locality. (I. C. C. 404).
- GROUP XIII—Consents on Township Roads. (I. C. C. 502).
- GROUP XIV—Abandoned rights of way. (I. C. C. 502-404).
- GROUP XV —Easements over bridges not owned. (I. C. C. 502).

The following Table No. III gives the total of such groupings under Interstate Commerce Commission Accounts, and the details are shown in Appendix No. 2 of Exhibit X-44.

TABLE No. III

## Account 404

Group	Basis No. 2	Basis No. 3	Basis No. 4
II	\$167,027.00	\$ 258,150.00	\$ 346,970.00
III	39,293.00	116,640.00	117,640.00
IV	136,487.00	327,900.00	584,300.00
V	10,719.00	12,500.00	12,500.00
VI	19,500.00	63,000.00	114,000.00
IX	.....	.....	338,156.44
XII	301,144.92	478,830.00	642,010.00
XIV	.....	.....	37,183.26
Total 404	\$ 674,170.92	\$1,257,020.00	\$2,192,759.70

Account 502			
VI	\$ 16,500.00	\$ 20,000.00	\$ 23,400.00
VII	4,900.00	4,350.00	4,350.00
VIII	484,346.34	1,406,250.00	2,322,737.00
IX	338,156.44	338,156.44	.....
X	319,130.71	377,730.00	510,190.00
XI	11,392.84	15,442.00	34,235.00
XIII	82,000.26	82,000.26	82,000.26
XIV	37,183.26	37,183.26	.....
XV	23,000.00	23,000.00	23,000.00
Total 502	\$1,316,609.85	\$2,304,111.96	\$2,999,912.26

## Account 503

I	\$1,040,809.24	\$2,449,030.00	\$3,431,643.00
II	173,520.00	250,000.00	356,000.00
V	25,948.20	101,700.00	123,900.00
VI	32,141.50	56,300.00	88,550.00
VII	10,521.00	8,000.00	9,080.00
Total 503.....	\$1,282,939.94	\$2,855,030.00	\$4,009,173.00
Total 502 and 503.	\$2,599,549.79	\$2,169,141.96	\$7,009,085.26
Grand Total.....	\$3,273,720.71	\$6,426,161.96	\$9,201,844.96

## STRUCTURAL OVERHEAD COST

This Board finds that certain construction expenditures, for (1) engineering and superintendence, (2) legal services, administration and miscellaneous general expenses, (3) interest during construction, (4) taxes during construction and (5) financing, all of which have been made and would have to be made again in reproducing this property, cannot be accurately apportioned among the various inventory items.

It has been the practice heretofore, in connection with reproduction cost estimates, to estimate these overhead expenses by taking either a percentage of the total property expenditure or a lump sum intended to cover all such items. This Board has recognized the limitation of such a procedure and accordingly has considered separately what the probable expenditures would be for each of the several services named, taking into account all the available evidence on the conditions and cost of reproducing this property.

In developing an estimate of such expenditures, the construction period has been taken as beginning when the entrepreneurs have secured the agreements of bankers to supply funds necessary for construction. By this time franchises have been obtained; options on a considerable portion of the rights of way have been secured; property owners consents have been obtained along township roads; a certificate of public convenience has been secured; and all such preliminaries have been taken care of. It would be impracticable to construct complete as large a property as the Pittsburgh System within less than four years. This would be at the rate of 150 miles of track per year. After the entire property has been placed in operation, from six months to a year would be required to finish minor details and to settle contracts and claims.

The total construction period therefore would cover from five to five and one-half years, although there would be an over-lap of about four years with partial operation and an over-lap of a year and one-half with complete operation. A program for the reproduction of this property is explained in detail in Exhibit R-25, and was carefully considered by the Board.

In many utility appraisals, the stated allowances for structural overhead costs have been lower on expenditures for land than on expenditures for other property, particularly in cases where the land holdings are necessarily large, and the unit cost of the attention required is correspondingly less. This Board does not make a separate application of the final overhead allowance to land expenditures; the Board has however given due consideration to this fact and has developed a weighted percent which takes into account not only the special significance of land but also the relative importance of all the other items of physical property.

### Engineering and Superintendence (I. C. C. Account 501)

Engineering work during construction is found by experience to show about the same cost whether handled by a staff organized by the utility company or by an outside engineering concern. The engineering work to be covered by a structural overhead allowance includes location surveys, general and detailed designs, preparation of specifications, review of bids for construction, furnishing lines and grades for contractors, additional inspection and supervision of construction, checking contractors' estimates and performing various services for administrative officers, fiscal agents, land department, public service commissions, courts, etc. This allowance also covers the employment of consulting engineers and architects, and local engineers in special cases.

The usual cost of engineering services in construction work of this nature is about  $5\frac{1}{2}\%$  of the property expenditures, excluding those for land on which the cost ranges from 2 to  $5\frac{1}{2}\%$ , depending upon local conditions. The cost of engineering was estimated to vary from  $1\frac{1}{2}\%$  to  $7\frac{1}{2}\%$  for different items of this property. The weighted average is  $4\frac{1}{2}\%$ . In this case the weighted average properly falls below the  $5\frac{1}{2}\%$  ordinarily experienced on account of the absence from the inventory of power stations and equipment, as the Company purchases its energy from the Duquesne Light Company and has virtually turned its power stations over to that company. The Board finds that the  $4\frac{1}{2}\%$  allowance for engineering should be applied to all physical property expenditures including real estate.

### **Administrative, Legal and Miscellaneous General Expenses (I. C. C. Accounts 546 and 550)**

The administrative officers during the construction period would be required to complete the occupation rights, franchise routes and terms, land purchases and the acquisition of bridge and crossing rights. Negotiations and formalities incident to issuing securities would have to be completed. This Board has not made an allowance for a separate general contractor in the reproduction of this property and the administrative officers would purchase materials and equipment. Book-keeping, auditing and paymaster's departments would have to be organized for the care of and accounting for funds. The development of satisfactory public relations would require the attention of the general officers. They would also have to negotiate the construction contracts and handle the general prosecution of the work, by maintaining supervision of the legal and engineering departments. An operating organization would have to be perfected.

The legal department necessarily would embrace general counsel, special advisory counsel secured from time to time, local counsel in important localities, real estate and right of way bureaus and a personal claims bureau.

Miscellaneous general expenses would cover such items as office and travel expenses and incidentals, stationery, printing and insurance.

The services of the administrative and legal officers and the miscellaneous general expense would continue during the entire construction period, including the over-lap with operation. The Board finds that the proper allowance for this item is 3.5%.

### **Interest During Construction (I. C. C. Account 547)**

For the computation of interest during construction, the period of construction is defined to begin with the agreements of bankers to supply the funds necessary for construction and to end for each section when its operation begins.

It is estimated, as shown in detail by the reproduction program listed in Exhibit R-25, that one-quarter of the property would go into operation 18 months after the beginning of construction and that one-quarter would go into operation at the end of each of the next three years. Practically all of the land and rights of way would have to be purchased during the first two years of construction and the interest accruals were so calculated.

The annual interest rate was taken at 6% for Bases No. 2 and 3A as this was considered a fair prevailing rate for the price period assumed in these bases. A varying annual interest rate up to 8% was taken for Bases No. 3B, 3C, 3D and 4 for the same reason. The construction period on which to apply these rates was taken as one year for Basis No. 2, as gradual additions to property are assumed under this basis, and at one and one-third years for the other bases, where the entire investment is to be reproduced in four to five years. The results of the time and rate assumptions expressed as a percentage of the total investment are as follows:

- Basis No. 2 6.0% of total property expenditure.
- Basis No. 3A 8.0% of total property expenditure.
- Basis No. 3B 8.5% of total property expenditure.
- Basis No. 3C 9.0% of total property expenditure.
- Basis No. 3D 10.0% of total property expenditure.
- Basis No. 4 11.0% of total property expenditure.

**Taxes During Construction (I. C. C. Account 549)**

In determining the allowance for taxes during construction, Exhibits R-9 and C-7 were studied and the following table prepared showing payments by the Company of taxes which would be applicable to the construction period in the reproduction of the property.

TABLE No. IV

**Actual Payment of Taxes Applicable to Construction Period**

	Paid to United States on Non-Exempt Bonds	Paid to State on Corporate Stock and Corporate Loans	Paid to County- Cities, etc., on Property	Paid to Cities and Boroughs on Car, Pole and Wire Licenses	Total
1913		\$252,516.94	\$36,408.70	\$4,735.68	\$293,661.32
1914	\$1,533.90	238,217.32	35,700.04	5,250.64	278,701.90
1915	11,339.30	243,150.53	34,546.87	29,894.85	318,931.55
1916	11,635.34	279,100.66	43,683.95	34,091.01	368,510.96
1917	11,422.45	263,382.03	41,805.32	29,448.75	346,058.55
Average	\$7,186.20	\$255,273.50	\$38,028.58	\$20,684.19	\$321,172.47

*Note:*—Taxes incident to operation only, such as taxes on gross revenue, are not included in this table.

This table shows an average annual payment of **\$320,057.70** which is approximately **0.7%** on the cost of reproduction of the physical property on Basis 3A. The Board determined that it was reasonable to apply this rate for a period of one year taking into account, among other things, the lag between a given construction expenditure and the first payment of taxes thereon. The same ratio and period were applied to the other bases.

**Cost of Financing**

This Board is informed as to the decisions of the Public Service Commission and the Courts relative to bond discount. In this case, taking into account the magnitude of the property and the amount of securities necessary to be issued, to reproduce it, the Board is unanimously of the opinion that there is an additional element of cost, separate and distinct from bond discount which may be properly considered as a cost for services that should be included, like engineering or legal expenses, in the cost of property.

We submit that a distinct factor in the cost of reproducing this large property, not present perhaps in a smaller one, is the expense involved in assembling the necessary capital. This expense is commonly met by money retained from the sale of securities, so that the utility company receives less than the sale price. Moreover, the sale of these securities to the ultimate holder is frequently at less than par, so that the sum actually realized to be devoted to construction purposes is still further reduced below the face value of the securities.

There are two elements of expense which make up the difference between actual sale price to the investors and what the company realizes, and the significance of each element is recognized by this Board in arriving at a fair estimate of allowances for cost of financing. The first element represents only the reasonable compensation for bankers' services in marketing the securities and forwarding the funds yielded. It covers personal and corporate service and the expenses of examination, negotiation, advertising and selling, through all of the various stages until the sale to the final investor is effected. Such expense would be incurred, even if the utility company dispensed with bankers and marketed its securities through its own salesmen and agents. In fact, this latter method undoubtedly would require more time and cost more than if recourse were had to an existing banking house with established reputation and clientele.

The second element of cost in financing is experienced in the case of an issue of securities running into many millions of dollars, like those of the property in question. This is the underwriting of a large firm or a syndicate to guarantee that the entire issue will be promptly marketed without even a temporary lack of funds to embarrass the company or halt construction.

These two elements of expense, comprehending the cost of the organization furnishing financial services to the company, are in the same class, in the opinion of this Board, with the cost of services furnished by the engineering, legal and administrative organizations of the company, and therefore constitute a part of the cost of reproduction.

Frequently in selling the securities, the foregoing costs are merged with an additional definitely recognized element which reduces the sales price of securities below par value. This element is that of bond discount which may be required to attract investors and which is a mere adjustment of the stated rate of return on the securities to yields prevailing at the time of sale. In essence this discount is absolutely distinct from the true costs of financing; it is virtually a prepayment of interest which is disregarded by this Board in conformity with decisions of the Commission in estimating structural overhead costs. It is properly to be taken care of in rate of return.

There were found in the records of the various underlying companies of the Pittsburgh Railways, numerous instances of commissions paid for the distribution of bonds.

An illustration of the various steps in placing securities, and an example disclosing the elements of banking service, underwriting and discount is afforded by a recent case, of which this Board has cognizance, involving the issue of several million dollars in three-year 6% notes of a large public utility company. The company received 90.5 for those notes. The underwriting syndicate, which acted in a wholesaler's capacity, received 94, making this cost to the company 3.5% of the face value, or 3.9% of the cash received by the company. The retail distributors placed the notes in the hands of the public at 96, giving them a margin of 2% face value, or 2.2% of the cash received by the company, the total cost to the company being 5.5% of face value, or 6.1% of the cash actually received for this security.

In this example, the actual cost of the underwriting to the company, was 3.9%. The 2.2% received by the distributors who placed the notes in the hands of the public, constituted the cost of marketing. These two percentages together, totaling 6.1%, represent the cost of financing as defined by this Board. The difference between the price at which the notes were sold to the public and their face value, or 4.4% of the amount realized by the company, was bond discount.

On account of the manner in which stocks are generally distributed, it is impossible to determine the exact cost of distribution; but as stocks are unsecured they are less attractive from an investment point of view than bonds; and, therefore, the actual expense of distribution would be greater. As a result, the average cost of securing all the money required for the reproduction of a company's property would be greater than the cost of the money secured by bonds.

The Board estimates that for Basis No. 2, reproduction as of the actual date of construction, when the electric railway industry was new and the companies were smaller, the cost of financing is 3%; for Basis No. 3, reproduction when the electric railway industry was fully developed and its securities regarded with favor, the cost of financing is 2.5%; for Basis No. 4, reproduction as of the present when the cost of money for all purposes is very high, the cost of financing is 5%.

#### **ORGANIZATION AND DEVELOPMENT PRIOR TO CONSTRUCTION**

This Board defines "organization and development prior to construction" costs as all reasonable compensation for services and expenses necessary in the organization and development of a company from the time of its inception to the time when the charter, franchise and other rights have been secured, and agreement obtained to furnish the capital and the project brought to a point where construction can be commenced.

The costs comprised under this heading would include (1) compensation on a reasonable salary basis for the service of entrepreneurs, (2) salaries of stenographers and clerks and other assistants, (3) general expenses such as rent, traveling expense, etc., (4) advertising, (5) expenses for obtaining charters such as bonus to State on capital stock, (6) expenses of obtaining ordinances and franchises, (7) legal expenses, (8) technical expenses, (9) expenses of merging and consolidating smaller companies under larger groups, (10) interest on expenditures incurred during this period.

Estimates of "organization and development prior to construction" costs were prepared on the basis of reproducing the present corporate structure which is the result of mergers, consolidations, leases and operating agreements. Many details of actual expenditures were found in the records and the same were incorporated in and made the basis of the estimates agreed to. The details of these estimates are to be found in Exhibit X-43.

This Board, having in mind the different periods corresponding to the various bases, finds that a reasonable cost for organization and development prior to construction of the Pittsburgh Railways System is \$1,524,000 for Bases No. 2, 3A and 3B, and \$1,847,500 for Bases No. 3C, 3D and 4.

### WORKING CAPITAL

This Board defines "working capital" as the total mobile capital required in addition to the fixed capital. Working capital may appear as cash or equivalent, materials and supplies. It is that reservoir of funds which is necessary for the efficient and economical transactions of daily operation. This Board has separated working capital into two elements, in order better to apply the actual experience of the Company.

The first element covers general stores and supplies. The inventory of stock in store houses and storage yards, carried in the general accounts of the Company, and not including the miscellaneous distributed small stocks of supplies and tools in barns and shops, showed \$906,571. The check of this stock by the Bureaus of Accounting and Engineering of the Public Service Commission showed that it was normal for this property. The smaller scattered amounts in the shops and barns, the stores of track and roadway supplies at various locations and the scrap materials, salvaged from completed jobs but not yet disposed of, were all inventoried and found to amount to \$227,429, which amount added to the foregoing figure for materials makes a total of \$1,134,000. This Board finds that an allowance for materials and supplies, as a part of the mobile capital, should be \$1,134,000.

The second element in working capital covers funds necessary to meet minor irregular payments incident to the ordinary conduct of the business, for the prompt payment of bills in order to secure trade discounts, for prepayments which may be desirable and necessary, and for the purchase of materials in an advantageous market in advance of pressing necessities.

This Board knows of no generally accepted rule for determining the amount of working capital necessary in this case. There are, however, various ways in which the problem can be approached and figures have been deduced to show the range of estimates.

The balance sheets of a company may be used to throw light on the required working capital. Analysis must be made to determine what construction is in progress and to what extent the construction accounts have been merged with the operating accounts. The cash account should be studied to ascertain for what purposes the cash on hand has been assembled. To obtain the figure of the working capital from the balance sheets, cash, prepaid accounts, accounts receivable and bills receivable should be added and accounts payable and bills payable should be deducted from the total so obtained. The balance sheets of earlier years do not afford a conclusive figure inasmuch as the Company in the past has depended more or less upon the resources of the Philadelphia Company. Moreover, the money requirement of the present and future, on account of higher prices, will be much greater than in the past. Furthermore, it is desirable to maintain a higher standard of credit than the Company has enjoyed. This last may be effected principally by the establishment of proper reserves but it is promoted also by adequate working capital. For the year 1918 the balance sheets show an average figure of \$1,031,468.

A second method of estimating this element of working capital is to assume that it is, exclusive of materials and supplies, equal to one month's operating expenses. This basis makes the working capital of the Company average \$1,182,780 for January, February, and March, 1919.

A third method of estimating this allowance, sometimes employed, is to assume that a percentage of either property account or outstanding securities is representative. Sometimes in following this plan, two per cent. on the property account is applied.

A fourth method of estimating the working capital required is to apply business judgment. The opinion of the Receivers for the Company is that a cash balance of not less than \$750,000 should always be maintained, which minimum cash figure increased by amounts receivable less amounts payable totals \$975,402.

The details of all the estimates are to be found in Exhibit R-17.

This Board finds, after giving due consideration to the fact that the street railway business is a cash one, revenues being collected almost entirely in advance of ordinary disbursements, that \$1,075,000 should be allowed for cash working capital, and that \$1,134,000 should be allowed for stores and supplies, making the sum total \$2,209,000 for working capital.

PITTSBURGH RAILWAYS COMPANY

Estimated Cost of Reproduction New of the Property as of April 1, 1918

Summary by Interstate Commerce Commission Primary Accounts

BASIS No. 2, ORIGINAL PRICES

I. C. C. Account Number	Title	Estimated Cost of Re- production New
501	Engineering and Superintendence	81,537,651
502	Right of Way	1,881,995
503	Other Land Used in Operation	1,282,940
504	Grading	2,731,883
505	Ballast	2,361,279
506	Ties	1,030,922
507	Rails, Rail Fastenings and Joints	3,104,021
508	Special Work	2,252,639
510	Tracks and Roadway Labor	1,997,087
511	Paving	3,494,010
512	Roadway Machinery and Tools	68,522
513	Tunnels and Subways	871,897
515	Bridges, Trestles and Culverts	1,894,913
516	Crossings, Fences and Signs	13,267
517	Signals and Interlocking Apparatus	1,840
518	Telephone and Telegraph Lines	8,361
519	Poles and Fixtures	1,074,853
520	Underground Conduits	47,414
521	Distribution System	2,158,996
523	Shops and Carhouses	1,554,273
524	Stations, Miscellaneous Buildings and Structures	107,037
530	Passenger and Combination Cars	1,283,073
531	Freight, Express and Mail Cars	25,280
532	Service Equipment	219,628
533	Electric Equipment of Cars	2,915,739
536	Shop Equipment	297,648
537	Furniture	116,848
538	Miscellaneous Equipment	45,773
540	Substation Buildings	182,461
543	Substation Equipment	779,553
544	Transmission System	151,199
546	Law Expenditures and	1,345,445
550	Administration	
547	Interest During Construction	2,570,902
549	Taxes During Construction	299,039
550	Miscellaneous—	
	(a) Cost of Financing	1,371,576
	(b) Organization and Development Cost prior to Construction	1,524,000
	*Inclines	458,001
	Material and Supplies and Working Capital	2,234,000
404	†Miscellaneous Physical Property	961,323
	Total	\$49,324,791

\*Not distributed by I. C. C. Accounts.

†\$216,298 of overhead charges included above applies to Account 404, Miscellaneous Physical Property.

PITTSBURGH RAILWAYS COMPANY

Estimated Cost of Reproduction New of the Property as of April 1, 1918

Summary by Interstate Commerce Commission Primary Accounts

BASIS No. 3A, AVERAGE 1906 TO 1915

I. C. C. Account Number	Title	Estimated Cost of Repro- duction New
501	Engineering and Superintendence.....	\$1,743,833
502	Right of Way.....	2,871,283
503	Other Land Used in Operation.....	2,865,030
504	Grading.....	3,339,790
505	Ballast.....	2,370,950
506	Ties.....	1,252,596
507	Rails, Rail Fastenings, and Joints.....	3,212,972
508	Special Work.....	2,341,614
510	Track and Roadway Labor.....	2,139,168
511	Paving.....	3,773,440
512	Roadway Machinery and Tools.....	68,522
513	Tunnels and Subways.....	874,897
515	Bridges, Trestles, and Culverts.....	1,958,246
516	Crossings, Fences, and Signs.....	42,876
517	Signals and Interlocking Apparatus.....	5,039
518	Telephone and Telegraph Lines.....	8,361
519	Poles and Fixtures.....	1,024,832
520	Underground Conduits.....	47,414
521	Distribution System.....	2,176,130
523	Shops and Carhouses.....	1,935,202
524	Stations, Miscellaneous Buildings and Structures.....	116,009
530	Passenger and Combination Cars.....	4,215,001
531	Freight, Express, and Mail Cars.....	22,699
532	Service Equipment.....	213,491
533	Electric Equipment of Cars.....	3,013,362
536	Shop Equipment.....	297,648
537	Furniture.....	116,848
538	Miscellaneous Equipment.....	45,773
540	Substation Buildings.....	185,484
543	Substation Equipment.....	796,330
544	Transmission System.....	150,701
546	Law Expenditures and }.....	1,525,854
550	Administration }.....	
547	Interest During Construction.....	3,871,162
549	Taxes During Construction.....	338,727
550	Miscellaneous—	
	(a) Cost of Financing.....	1,314,985
	(b) Organization and Development Cost prior to Construction.....	1,524,000
...*Inclines.....		553,303
... Material and Supplies and Working Capital.....		2,234,000
404 †Miscellaneous Physical Property.....		1,560,826
Total.....		\$56,148,398

\*Not distributed by I. C. C. Accounts.

†\$369,916 of overhead charges included above applies to Account 404, Miscellaneous Physical Property.

PITTSBURGH RAILWAYS COMPANY

Estimated Cost of Reproduction New of the Property as of April 1, 1918

Summary by Interstate Commerce Commission Primary Accounts

BASIS No. 3B, 1918 AT 20 YEAR TREND

I. C. C. Account Number	Title	Estimated Cost of Repro- duction New
501	Engineering and Superintendence	\$1,891,300
502	Right of Way.....	2,928,000
503	Other Land Used in Operation.....	2,865,000
504	Grading.....	3,673,800
505	Ballast.....	2,608,000
506	Ties.....	1,377,900
507	Rails, Rail Fastenings, and Joints.....	3,534,300
508	Special Work.....	2,575,800
510	Track and Roadway Labor.....	2,353,100
511	Paving.....	4,150,800
512	Roadway Machinery and Tools.....	75,400
513	Tunnels and Subways.....	962,400
515	Bridges, Trestles, and Culverts.....	2,154,100
516	Crossings, Fences, and Signs.....	47,200
517	Signals and Interlocking Apparatus.....	5,500
518	Telephone and Telegraph Lines.....	9,200
519	Poles and Fixtures.....	1,127,300
520	Underground Conduits.....	52,200
521	Distribution System.....	2,393,700
523	Shops and Carhouses.....	2,128,700
524	Stations, Miscellaneous Buildings and Structures.....	127,600
530	Passenger and Combination Cars.....	4,636,500
531	Freight, Express, and Mail Cars.....	24,900
532	Service Equipment.....	234,800
533	Electric Equipment of Cars.....	3,314,700
536	Shop Equipment.....	327,400
537	Furniture.....	128,500
538	Miscellaneous Equipment.....	50,300
540	Substation Buildings.....	204,000
543	Substation Equipment.....	876,000
544	Transmission System.....	165,800
546	Law Expenditures and }.....	1,654,900
550	Administration.....	
547	Interest During Construction.....	4,450,000
549	Taxes During Construction.....	366,500
550	Miscellaneous—	
	(a) Cost of Financing.....	1,429,200
	(b) Organization and Development Cost prior to Construction.....	1,524,000
...	*Inclines.....	608,600
...	Material and Supplies and Working Capital.....	2,234,000
404	†Miscellaneous Physical Property.....	1,560,800
	Total.....	\$60,832,200

\*Not distributed by I. C. C. Accounts.

†\$373,000 of overhead charges included above applies to Account 404, Miscellaneous Physical Property

PITTSBURGH RAILWAYS COMPANY

Estimated Cost of Reproduction New of the Property as of April 1, 1918

Summary by Interstate Commerce Commission Primary Accounts

BASIS No. 3C, AVERAGE 1914 TO 1918

I. C. C. Account Number	Title	Estimated Cost of Repro- duction New
501	Engineering and Superintendence.	\$2,235,400
502	Right of Way.	3,060,300
503	Other Land Used in Operation.	2,865,000
504	Grading.	4,435,000
505	Ballast.	3,161,300
506	Ties.	1,670,100
507	Rails, Rail Fastenings and Joints.	4,284,000
508	Special Work.	3,122,200
510	Track and Roadway Labor.	2,852,200
511	Paving.	5,031,300
512	Roadway Machinery and Tools.	91,400
513	Tunnels and Subways.	1,166,500
515	Bridges, Trestles and Culverts.	2,611,000
516	Crossings, Fences, and Signs.	57,200
517	Signals and Interlocking Apparatus.	6,700
518	Telephone and Telegraph Lines.	11,100
519	Poles and Fixtures.	1,366,400
520	Underground Conduits.	63,200
521	Distribution System.	2,901,500
523	Shops and Carhouses.	2,580,300
524	Stations, Miscellaneous Buildings and Structures.	154,700
530	Passenger and Combination Cars.	5,620,000
531	Freight, Express and Mail Cars.	30,300
532	Service Equipment.	284,700
533	Electric Equipment of Cars.	4,017,800
536	Shop Equipment.	396,900
537	Furniture.	155,800
538	Miscellaneous Equipment.	61,000
540	Substation Buildings.	247,300
543	Substation Equipment.	1,061,800
544	Transmission System.	200,900
546	Law Expenditures and }.	1,955,900
550	Administration	
547	Interest During Construction.	5,573,100
549	Taxes During Construction.	433,500
550	Miscellaneous—	
	(a) Cost of Financing.	3,396,500
	(b) Organization and Development Cost prior to Construction.	1,847,500
...	*Inclines.	737,700
...	Material and Supplies and Working Capital.	2,234,000
404	†Miscellaneous Physical Property.	1,560,800
	Total.	\$73,560,300

\*Not distributed by I. C. C. Accounts.

†\$430,800 of overhead charges included above applies to Account 404, Miscellaneous Physical Property.

PITTSBURGH RAILWAYS COMPANY

Estimated Cost of Reproduction New of the Property as of April 1, 1918

Summary by Interstate Commerce Commission Primary Accounts

BASIS No. 3D, AVERAGE 1918 TO 1922

I. C. C. Account Number	Title	Estimated Cost of Repro- duction New
501	Engineering and Superintendence.	\$2,554,900
502	Right of Way.	3,183,200
503	Other Land Used in Operation.	2,865,000
504	Grading.	5,176,700
505	Ballast.	3,675,000
506	Ties.	1,941,500
507	Rails, Rail Fastenings, and Joints.	4,980,100
508	Special Work.	3,629,500
510	Track and Roadway Labor.	3,315,700
511	Paving.	5,848,800
512	Roadway Machinery and Tools.	106,200
513	Tunnels and Subways.	1,356,100
515	Bridges, Trestles, and Culverts.	3,035,300
516	Crossings, Fences, and Signs.	66,500
517	Signals and Interlocking Apparatus.	7,800
518	Telephone and Telegraph Lines.	13,000
519	Poles and Fixtures.	1,588,500
520	Underground Conduits.	73,500
521	Distribution System.	3,373,000
523	Shops and Carhouses.	2,999,600
524	Stations, Miscellaneous Buildings and Structures.	179,800
530	Passenger and Combination Cars.	6,533,300
531	Freight, Express, and Mail Cars.	35,200
532	Service Equipment.	330,900
533	Electric Equipment of Cars.	4,670,700
536	Shop Equipment.	461,400
537	Furniture.	181,100
538	Miscellaneous Equipment.	70,900
540	Substation Buildings.	287,500
543	Substation Equipment.	1,234,300
544	Transmission System.	233,600
546	Law Expenditures and }	2,235,500
550	Administration	
547	Interest During Construction.	7,051,000
549	Taxes During Construction.	493,600
550	Miscellaneous—	
	(a) Cost of Financing.	3,902,700
	(b) Organization and Development Cost prior to Construction.	1,847,500
	*Inclines.	857,600
	Material and Supplies and Working Capital.	2,234,000
404	†Miscellaneous Physical Property.	1,560,800
	Total.	\$84,191,300

\*Not distributed by I. C. C. Accounts.

(\$441,700 of overhead charges included above applies to Account 404, Miscellaneous Physical Property.

PITTSBURGH RAILWAYS COMPANY

Estimated Cost of Reproduction New of the Property as of April 1, 1918

Summary by Interstate Commerce Commission Primary Accounts

BASIS No. 4, CURRENT

I. C. C. Account Number	Title	Estimated Cost of Repro- duction New
501	Engineering and Superintendence.....	\$3,123,108
502	Right of Way.....	3,630,799
503	Other Land Used in Operation.....	4,009,173
504	Grading.....	6,397,998
505	Ballast.....	3,498,211
506	Ties.....	1,790,390
507	Rails, Rail Fastenings, and Joints.....	7,518,034
508	Special Work.....	5,333,587
510	Track and Roadway Labor.....	4,304,320
511	Paving.....	5,982,631
512	Roadway Machinery and Tools.....	119,914
513	Tunnels and Subways.....	1,749,795
515	Bridges, Trestles, and Culverts.....	3,879,137
516	Crossings, Fences, and Signs.....	68,286
517	Signals and Interlocking Apparatus.....	8,195
518	Telephone and Telegraph Lines.....	12,692
519	Poles and Fixtures.....	2,326,199
520	Underground Conduits.....	80,130
521	Distribution System.....	3,426,106
523	Shops and Carhouses.....	3,480,475
524	Stations, Miscellaneous Buildings and Structures.....	204,734
530	Passenger and Combination Cars.....	7,690,446
531	Freight, Express, and Mail Cars.....	41,085
532	Service Equipment.....	383,346
533	Electric Equipment of Cars.....	5,683,261
536	Shop Equipment.....	535,766
537	Furniture.....	175,272
538	Miscellaneous Equipment.....	54,249
540	Substation Buildings.....	334,067
543	Substation Equipment.....	1,461,588
544	Transmission System.....	246,277
546	Law Expenditures and }.....	2,732,719
550	Administration }.....	
547	Interest During Construction.....	9,435,913
549	Taxes During Construction.....	600,467
550	Miscellaneous—	
	(a) Cost of Financing.....	4,790,870
	(b) Organization and Development Cost prior to Construction.....	1,847,500
...	*Inclines.....	1,027,500
...	Material and Supplies and Working Capital.....	2,234,000
404	†Miscellaneous Physical Property.....	2,624,034
	Total.....	\$102,842,274

\*Not distributed by I. C. C. Accounts.

†\$755,700 of overhead charges included above applies to Account 404, Miscellaneous Physical Property.

## ACCRUED DEPRECIATION

To arrive at the accrued depreciation, as of April 1st, 1918, of the inventoried property, consideration was given only to the condition, at the time of inspection, affecting the ability of the item to give service. Obsolescence was not considered except in cases where the particular part could not be satisfactorily inspected, and in such cases recourse was had to life tables where obsolescence is automatically reflected. For example, car bodies were depreciated solely from the view point of how much of the original capacity for service the inspection showed still remained.

Wherever the part being depreciated had a scrap or salvage value this was recognized, and the agreed percent condition includes the remaining service value as well as the scrap value.

Track and paving were independently inspected by representatives of the City and of the Company. By later conferences an agreed percent condition was reached for each particular location of tangent track and special work. The complete track structure in any location, excepting only paving, was given the same percent as the rail. By similar conferences, agreements were also reached as to the conditions percent of paving for particular locations; some salvage would be possible from old paving blocks and the conditions percent assigned reflect this.

Grading on private right of way and paving outside of the track zone was assumed not to depreciate.

The Mt. Washington Tunnel was depreciated on the assumption of 100 year life.

The electric distribution system was depreciated from a consideration of the probable lives which would be realized in service. The multitude of small parts entering into this portion of the property makes a complete inspection impracticable, if not impossible. The larger elements were inspected in the field and given consideration in arriving at the probable lives and agreed percentages applied to the various subdivisions of the work.

Car bodies were independently inspected by City and Company representatives and an agreement reached on the condition of each car.

Electric equipment of cars was depreciated by life tables on a straight line basis. Motors, being made up of many component parts, can theoretically be kept in service continually by the proper renewals of individual parts. Any inspection, except a complete overhauling, would not disclose the true condition, so by agreement life tables were used.

Buildings were independently inspected by representatives of the City and the Company and an agreement as to condition reached.

Bridges were discussed in detail by representatives of the Public Service Commission, of the Company, and of the Company's engineers, all of whom were familiar with the condition of each structure. These men agreed to a percent condition for each structure.

Substation equipment was, by agreement, depreciated in the same manner as electric equipment of cars.

Shop equipment, tools, furniture, miscellaneous equipment, etc., the investment in which is comparatively small, were depreciated by applying percentages which were agreed to as representative of the particular class. No attempt was made to consider these items in detail.

## ACCRUED DEPRECIATION OF PARTS

## SUMMARY BY INTERSTATE COMMERCE COMMISSION ACCOUNTS

## BASIS No. 3A

## Average Prices of 1906-1915, inclusive

I. C. C. Account Number	Title	\$
502	Right of Way..	828
504	Grading.....	602,819
505	Ballast.....	1,150,241
506	Ties.....	595,572
507	Rails, Rail Fastenings, and Joints.....	1,092,783
508	Special Work.....	942,951
510	Track and Roadway Labor.....	1,058,061
511	Paving.....	1,221,804
512	Roadway Machinery and Tools.....	34,261
513	Tunnels and Subways.....	120,393
515	Bridges, Trestles and Culverts.....	519,437
516	Crossings, Fences and Signs.....	18,147
517	Signals and Interlocking Apparatus.....	2,159
518	Telephone and Telegraph Lines.....	2,675
519	Poles and Fixtures.....	352,994
520	Underground Conduits.....	4,741
521	Distribution System.....	313,471
523	Shops and Car Houses.....	364,232
524	Stations and Miscellaneous Buildings and Structures.....	30,461
530	Passenger and Combination Cars.....	1,505,698
531	Freight, Express and Mail Cars.....	12,126
532	Service Equipment.....	97,189
533	Electric Equipment of Cars.....	1,554,918
536	Shop Equipment.....	148,824
537	Furniture.....	58,424
538	Miscellaneous Equipment.....	22,886
540	Substation Buildings.....	22,119
543	Substation Equipment.....	164,398
544	Transmission System.....	22,182
	*Inclines.....	173,053
	Total.....	\$12,272,847

The above total, increased by 375%, representing one-half of the overhead structural costs for Engineering and Superintendence and for Administrative, Legal and Miscellaneous, results in the total reported on page 6.

†502 Right of Way charges, exclusive of Real Estate.

\*Not distributed by I. C. C. accounts

# ACCRUED DEPRECIATION OF PARTS

## SUMMARY BY INTERSTATE COMMERCE COMMISSION ACCOUNTS

### BASIS No. 4

#### Prices Current of April 1st, 1918

I. C. C. Account Number	Title	\$	1,086
502	†Right of Way.....	1,309,115	
504	Grading.....	1,687,271	
505	Ballast.....	842,598	
506	Ties.....	2,551,490	
507	Rails, Rail Fastenings, and Joints.....	2,132,485	
508	Special Work.....	2,114,570	
510	Track and Roadway Labor.....	2,072,200	
511	Paving.....	59,957	
512	Roadway Machinery and Tools.....	240,799	
513	Tunnels and Subways.....	1,103,496	
515	Bridges, Trestles and Culverts.....	28,675	
516	Crossings, Fences and Signs.....	3,576	
517	Signals and Interlocking Apparatus.....	4,061	
518	Telephone and Telegraph Lines.....	732,170	
519	Poles and Fixtures.....	8,012	
520	Underground Conduits.....	504,754	
521	Distribution System.....	658,947	
523	Shops and Car Houses.....	54,197	
524	Stations and Miscellaneous Buildings and Structures.....	2,740,012	
530	Passenger and Combination Cars.....	21,909	
531	Freight, Express and Mail Cars.....	174,280	
532	Service Equipment.....	2,933,079	
533	Electric Equipment of Cars.....	148,824	
536	Shop Equipment.....	58,424	
537	Furniture.....	27,125	
538	Miscellaneous Equipment.....	39,807	
540	Substation Buildings.....	302,070	
543	Substation Equipment.....	35,830	
544	Transmission System.....	325,326	
... *Inclines.....		\$22,916,145	
	Total.....		

The above total, increased by 3.75%, representing one-half of the overhead structural costs for Engineering and Superintendence and for Administrative, Legal and Miscellaneous, results in the total reported on page 6.

\*502 Right of Way charges, exclusive of Real Estate.

\*Not distributed by I. C. C. accounts.

### CALCULATION OF ANNUAL DEPRECIATION ALLOWANCE

Allowance for annual depreciation is that amount of money which should be set aside each year so that at the expiration of the useful life of an item, when renewal is necessary, there will have been accumulated an amount equal to the first cost of the item wherewith to defray the cost of such renewal.

This annual amount may be calculated on the Sinking Fund basis of annual increments to be put into a fund which at the time of renewal will have been increased by interest earnings to equal the desired amount. On the other hand, by the Straight Line basis, the accretions of interest are ignored; and the annual amounts are simply the total amount desired divided by the number of years in which it has to be accumulated. The first method naturally results in smaller annual amounts to be set aside and is highly desirable where the accumulation of a fund is inaugurated early in the life of the utility. In the case of this property, which has reached an average age where the cycle of renewals is calling for practically a constant annual expenditure, the straight line basis must be adopted. The only accruals which will not be expended annually are those for shops, carhouses and substations.

The depreciation allowance necessary was calculated for each item or group for which accrued depreciation had already been separately calculated by dividing the accrued depreciation by the number of years in which the property had been in use, that is to say by the number of years in which the total amount had accrued.

A portion of the annual allowances necessary for depreciation is already being expended under title of maintenance and deferred renewals. A consideration of the remaining additional amount necessary is treated under the discussion of operating expenses.

The total annual allowances as computed are shown in tables following:

## ESTIMATED ANNUAL AMOUNTS NECESSARY FOR RENEWALS

## SUMMARY BY INTERSTATE COMMERCE COMMISSION ACCOUNTS

## BASIS No. 3

## Average Prices of 1906-1915 inclusive

I. C. C. Account Number	Title	\$
502	†Right of Way.....	113
504	Grading.....	49,494
505	Ballast.....	84,353
506	Ties.....	73,653
507	Rails, Rail Fastenings, and Joints.....	77,482
508	Special Work.....	108,551
510	Track and Roadway Labor.....	77,879
511	Paving.....	99,002
512	Roadway Machinery and Tools.....	13,705
513	Tunnels and Subways.....	9,261
515	Bridges, Trestles and Culverts.....	47,884
516	Crossings, Fences and Signs*	2,486
517	Signals and Interlocking Apparatus.....	546
518	Telephone and Telegraph Lines.....	339
519	Poles and Fixtures.....	33,141
520	Underground Conduits.....	238
521	Distribution System.....	47,067
523	Shops and Car Houses.....	33,099
524	Stations and Miscellaneous Buildings and Structures.....	4,881
530	Passenger and Combination Cars.....	160,179
531	Freight, Express and Mail Cars.....	1,053
532	Service Equipment.....	11,611
533	Electric Equipment of Cars.....	134,299
536	Shop Equipment.....	29,765
537	Furniture.....	11,684
538	Miscellaneous Equipment.....	6,639
540	Substation Buildings.....	3,850
543	Substation Equipment.....	29,775
544	Transmission System.....	2,517
... *Inclines.....		7,448
	Total.....	\$1,161,994

†502 Right of Way charges, exclusive of Real Estate.

\*Not distributed by I. C. C. accounts.

## ESTIMATED ANNUAL AMOUNTS NECESSARY FOR RENEWALS

## SUMMARY BY INTERSTATE COMMERCE COMMISSION ACCOUNTS

## BASIS No. 4

## Prices Current April 1st, 1918

I. C. C. Account Number	Title	\$	153
502	†Right of Way.....		98,264
504	Grading.....		124,542
505	Ballast.....		104,984
506	Ties.....		182,735
507	Rails, Rail Fastenings, and Joints.....		248,913
508	Special Work.....		156,869
510	Track and Roadway Labor.....		156,355
511	Paving.....		23,983
512	Roadway, Machinery and Tools.....		18,523
513	Tunnels and Subways.....		95,756
515	Bridges, Trestles and Culverts.....		3,885
516	Crossings, Fences and Signs.....		872
517	Signals and Interlocking Apparatus.....		514
518	Telephone and Telegraph Lines.....		64,498
519	Poles and Fixtures.....		405
520	Underground Conduits.....		77,576
521	Distribution System.....		59,543
523	Shops and Car Houses.....		253,283
524	Stations and Miscellaneous Buildings and Structures.....		53,577
530	Passenger and Combination Cars.....		17,528
531	Freight, Express and Mail Cars.....		4,049
532	Service Equipment.....		6,921
533	Electric Equipment of Cars.....		13,774
536	Shop Equipment.....		\$2,152,689
537	Furniture.....		
538	Miscellaneous Equipment.....		
540	Substation Buildings.....		
543	Substation Equipment.....		
544	Transmission System.....		
*Inclines.....			
Total.....			

†502 Right of Way charges, exclusive of Real Estate.

\*Not distributed by I. C. C. accounts.

#### LOSS OF RETURN DURING EARLY YEARS OF OPERATION

By this title the Board defines an estimated item of the probable loss of interest during the early years of operation. It was agreed by the Board that in considering the reproduction of any going traction property there would probably occur some lag in earnings during the early years before the earnings were sufficient to pay a full fair rate of return on the property. An estimate of such loss in return must be predicated on the theory that the property is reasonably needed in the first instance, and that probably not over four to five years should elapse before the property was on a paying basis. An estimate was made of this loss under these reasonable assumptions. The resulting figure was equivalent to one full year's loss of the assumed rates of return on the entire investment. The amounts so calculated for the various bases are as follows:

Basis 3-A .....	\$3,400,000
Basis 3-B .....	3,800,000
Basis 3-C .....	4,900,000
Basis 3-D .....	6,000,000
Basis 4 .....	8,200,000

## Estimated Cost of Operation, Maintenance and Renewals

### General Effect of Trend of Prices

In general the operating expenses for 1920 have been estimated on the assumption that prices for materials will be less than the peak prices of 1918, will approximate those of the first half of 1919, and will be closely indicated by the prices of July, 1919. The labor costs in the estimates for the individual accounts have been taken at prices current during the first half of 1919.

This Board has given special study to price indication for the immediate future. Little more needs to be recorded than to note that from 1897 to 1915 prices were rising, due to a variety of definitely recognizable economic conditions which brought reductions in the purchasing power of a dollar. With the onset of the World War, the price curve took a sharp upward trend and continued to increase at a rapid rate until about September, 1918, when the price peak appears to have been reached. The Dun General Index rose from 73 in 1897, to 124 in 1915, and to 233 by the fall of 1918. This index number is based on wholesale quotations of 300 commodities of all classes. Dun's Miscellaneous Index rose from 12 in 1897, to 25 in 1915, and 35 in 1918. The index number for metals rose from 11.5 in 1897 to 16.5 in 1915 and 32.5 in 1917. When government control began to be important, this index fell, reaching 30.5 in 1918.

The question which has been discussed in many quarters is whether or not the high level of 1917 and 1918 will be maintained. There has been an actual decline in prices, small but sufficient to indicate that they will not remain at the high war level. The decline has been easy and the recovery from war conditions sufficient to show that a serious panic to bring prices tumbling down to pre-war level is unlikely. Although our experience is of short duration, the downward trend of prices appears to follow generally the experience disclosed by similarly plotting the index numbers for years following the Civil War.

Unless economic conditions change, prices probably will not come down to the pre-war level. Even had there been no war, such economic conditions as increases in the amount of gold, the extension of credits and competition in banking would have reduced the purchasing power of the dollar in 1918 some 4 percent from the 1915 figure; and this tendency would have continued until interrupted by some action, the nature of which we could not then and cannot now forecast. The increase in gold in this country and the extension of credits the world over was heightened by the recent war. The purchasing power of a dollar today for a public utility is apparently some 60 percent of what it was in 1915.

This Board is of the opinion (1) that prices for materials required for maintenance and renewals for way and structures were, in 1918, approximately 86% above the pre-war prices, (2) that in 1920 they will be 55% above the pre-war level.

### Maintenance of Way and Structures

To this account is charged all of the expense for materials and labor for the maintenance and renewals of track, bridges, paving, trolley distribution system and buildings and fixtures.

Like practically all other street railways in the country under unregulated conditions, this Company has made no distinct separation of charges between maintenance and renewals. There is, of course, no particular need for making such an accounting so long as the total amount expended, or set up in reserve, is sufficient to keep the property in good operating condition. It is only where a measure is needed of this total amount that attention is given to the depreciation computations. An estimate was made of the annual amount required to pay for renewals of way and structures items. Consideration was given to both the general life experience for street railway materials and to the special local conditions, which apply to the Pittsburgh property in particular. The cost of materials and labor used in these estimates were in general those current in July, 1919, being, in the judgment of the Board, an average of 55% above the pre-war level.

The maintenance accounts as kept by the Company were then examined to determine how much of the above estimated renewal charges were already being taken care of under the head of maintenance. Practically all items which involved materials were considered as renewal charges.

The accounts as kept by the Company, prior to the Receivership, carried the cost of renewals and replacements into a fixed capital account designated "Deferred Maintenance;" and in general about 10% of the balance in this account was carried into operating expenses each year, and designated "Expense for Deferred Maintenance." When the revenues in any year were sufficient to make it possible, a larger proportion of such balance than 10% was charged to operating expense, while if the revenues were low, a smaller proportion was so charged.

Since the Receivership has been in force, all expenditures for renewals and replacements have been charged to operating expenses.

The actual expenditures for renewals in each year, depended upon the immediate cash condition of the Company, as reflected in its working capital and surplus. No direct relation existed, therefore, between the actual renewal expenditures in each year and the amount charged to "expense for deferred maintenance." Under such conditions, no direct measure of the annual requirements of the property for maintenance and renewals is afforded by the accounts, as set up on the Company's books.

In estimating the expenses necessary for 1920 the Board has attempted to set up the total charge which it believes reasonable to meet the ordinary maintenance needs and the renewals which would normally fall due in that year. There has not been a sufficient amount of money expended on this property during the past ten years to keep the track and roadway up in good operating condition. The additional amounts which will be required within the next four years to bring this property up to good operating condition are treated, in this report, under the caption of "Rehabilitation." The amount set up does not contemplate the building up of a reserve fund to equal the total accrued depreciation of this property. The property is now considered as a seasoned property; and the component parts have arrived at an average age where the depreciation needs will practically remain constant, increasing only with the making of extensions or a further increase in material and labor prices. Only such part of the depreciation allowance as applies to items of long life will not be expended each year, but the amounts are supposed to take care of the small current renewals and to accumulate to take care of the large renewals, when they fall due.

The actual amount expended for the past four years, and the first six months of 1919, and the estimated amount for 1920 are as follows:

	Maintenance	Deferred Maintenance	Depreciation	Total
1915. Actual.....	\$ 980,065	\$459,120	\$.....	\$1,439,185
1916. Actual.....	1,073,154	197,277	.....	1,270,431
1917. Actual.....	1,114,700	239,776	.....	1,354,476
1918. Actual.....	1,594,366	9,668	.....	1,604,034
1919. 6 mos. to 6 30, Actual.....	1,190,585	.....	.....	1,190,585
1920. Estimate.....	1,743,000	.....	\$ 495,000	2,238,000

This table shows that the Board estimates the expenditures for maintenance and renewals in the future as considerably larger than those actually made in the past. This is due to three causes: (1) for some years past there were insufficient expenditures to make the proper renewals, (2) the prices of materials and labor have greatly increased, (3) no contribution was formerly made to a reserve for the renewal of items where the cycle of depreciation had not been completed.

## Maintenance of Equipment

To this account is charged all of the expense of repairing and maintaining car bodies, trucks, electric equipment of cars, and shop equipment. Practically all of the labor and material items which enter into the cost of car repairs have shown very marked increases during the past three years. The renewals, which are made on cars, are in the form of wheels, truck frames, armatures, field coils, controller parts and various body parts. A car can almost be kept in service indefinitely by these small renewals as far as mere running on the tracks is concerned. As a matter of fact, cars do actually wear out as a whole, or become inadequate for service as to size, type or economy in operation. If, therefore, the capital account for cars is not to be pyramided indefinitely, a sufficient amount must be set up each year so that cars can be retired at the end of their useful life and complete new modern units purchased. An estimate was made of the amount necessary to replace the equipment now in use as the replacement becomes due. In this case also the Company has not made additions to car equipment in past years sufficient to keep pace with the increased traffic demands, nor made changes in type desired for purposes of economy. The special increased car needs are treated under "Rehabilitation." Only the annual amounts necessary to retire the present used equipment were considered in estimating an annual allowance for depreciation of equipment.

The amounts actually expended for maintenance of equipment during the past four and one-half years and the estimated allowance for 1920 are as follows:

	Maintenance	Depreciation	Total
1915. Actual.....	\$ 583,714	\$.....	\$ 583,714
1916. Actual.....	733,018	.....	733,018
1917. Actual.....	965,669	.....	965,669
1918. Actual.....	1,838,078	.....	1,838,078
1919. 6 mos. to 6/30. Actual.....	952,356	.....	952,356
1920. Estimate.....	1,480,000	\$ 463,000	1,943,000

The foregoing statement shows clearly the increased cost of car maintenance due to the very severe winter of 1917-1918. The increases during that year centered largely on repairs of the electric equipments and trucks. It is estimated that the expenses in 1920 for purely maintenance items would be materially decreased below those in 1918 and the rate for the first half of 1919, due to the fact that the very severe effects of the 1918 winter conditions have now been taken care of. The increased labor cost and the very marked increased cost of all manufactured articles which enter into the repair of cars will keep the repair costs for 1920 well above the repair costs prior to 1917. The estimates are intended to be sufficient to keep the cars in first class repair and to provide a fund for renewals of the present used equipment.

## Traffic Expense

To this account is charged advertising, solicitation and promotion of business. The annual expenditure has ranged in the past ten years from \$20,000 to \$10,000. An unusual amount of advertising was done in 1918 due to fare changes and public announcements resulting therefrom. It is estimated that \$30,000 is a fair amount to cover the traffic expense for 1920. A statement of the expenditures under this item for the past four and one-half years and the estimated amount for 1920 is as follows:

1915	1916	1917	1918	1919	Estimate	
					6 mos. to 6/30	1920
\$29,603	\$29,144	\$24,568	\$42,673	\$18,515		\$30,000

## Power

To this account is charged the cost of power purchased, the cost of substation operation and the rent of transmission lines.

Under a fifty year contract entered into as of December 31st, 1913, between the Railways Company and the Duquesne Light Company, the Railways Company entirely discontinued the generation of electric power and bought its energy from the Duquesne Company. Under the terms of this contract, the Railways Company engaged to turn over to the Duquesne Company its power plants known as Manchester, 30th Street, 20th Street, Suburban, Glenwood and Meadowlands. At the date of this valuation, the transfer of only the 20th Street Station had been legally effected, so that the Railways Company still held title to the other five stations. These are virtually leased to the Duquesne Company, for the power bills of the Railways Company are credited with 6 percent interest on the stated sum of \$1,020,607, agreed upon in the contract as the value of the five power station properties. The power contract and various papers relating thereto are contained in Exhibits X-13 and S-6.

The cost of power under this contract is based on two main factors. The first is a fixed charge per kilowatt demand, arrived at on a basis of 10% upon \$3,719,070 agreed by the two companies to be the investment of the Duquesne Company, in plant used for railway purposes. The second factor is an energy charge based on the total quantity used by the Railways Company and on the actual switchboard cost of generation increased by 12.5% for overhead expense. The Railways Company also pays a rental of 15% on the investment which the Duquesne Company has made in transmission lines used for railway power.

The contract is, in effect, an arrangement whereby the Railways Company pays the equivalent of 6% interest and a 4% depreciation charge on the plant devoted to railway current generation. The overhead allowance to cover general expenses of 12.5%, which is added to the switchboard cost, is a reasonable figure for such expenses. One of the principal benefits which the Railways Company derives is that the operation is combined with the large generation of current for light and power purposes by the Duquesne Company, which permits of a very low switchboard cost.

The Board is of the opinion that this contract is fair to the Railways Company and represents a saving over the probable cost of generating current for railway purposes only and is equally as favorable as could be obtained from any independent power company not affiliated with the Railways Company.

The cost per kilowatt hour increased in 1917 and 1918 due to large increases in the cost of fuel and some increase in the cost of power station labor. The Board estimates that the fuel cost will decrease somewhat in 1920 and estimates a slightly lower cost per kilowatt hour than was in effect in 1918. The total and unit costs of purchased power in the past four and one-half years, together with the total expense for power (including superintendence, substation expenses and rent of transmission lines), are as follows:

	Total Cost of Purchased Power	Cents per Kilowatt Hour Purchased Power	Total Expense for Power
1915. Actual.....	\$1,081,717	0.596	\$1,168,623
1916. Actual.....	1,331,004	0.690	1,427,373
1917. Actual.....	1,713,455	0.871	1,843,646
1918. Actual.....	1,747,390	1.007	1,871,617
1919. 6 mos. to 6/30, Actual.....	986,126	1.05	1,057,955
1920. Estimate.....	1,760,000	0.88	1,900,000

### Conducting Transportation

To this account are charged the wages of motormen and conductors, car house employees who clean and inspect cars, supervisors, station employees and miscellaneous car service expense. The wages of motormen and conductors comprise the greater portion of this expense. The account, being almost entirely labor, will vary directly with any changes made in the general rate for motormen and conductors. The present wage scale of 43-45-48 cents per hour was used in computing the 1920 expenses. A decision on increase in wages for Pittsburgh car men is to be handed down shortly by the War Labor Board. Any increase granted will mean an increase in expenses of approximately \$85,000 per year, for conductors and motormen alone, for each one cent per hour of advance in rate. Any such amounts allowed must be added to the 1920 estimate made by this Board to obtain a correct figure. The wages of passenger conductors and motormen and the other expenses of conducting transportation for the past four and one-half years with the 1920 estimate are as follows:

	Passenger Trainmen's Wages	Other Transportation Expenses	Total
1915. Actual.....	\$2,409,951	\$ 631,489	\$3,041,440
1916. Actual.....	2,717,383	708,633	3,426,016
1917. Actual.....	2,851,830	835,020	3,686,850
1918. Actual.....	3,425,815	1,123,674	4,549,489
1919. 6 mos. to 6-30, Actual.....	1,573,262	985,723	2,558,985
1920. Estimate.....	4,256,000	1,175,000	5,431,000

### Injuries and Damages

To this account are charged the actual payments made to claimants and all of the legal and investigational expense incident thereto. This account usually varies with the number of passengers hauled and car miles operated. The account has been increasing within the past few years due to the fact that a number of serious accidents have occurred, resulting in injury to a large number of persons at one time. Many companies set up a reserve of 4% of the gross receipts to cover these items. The unusually severe operating conditions in Pittsburgh with the steep grades, many curves and narrow streets, tend to increase accidents and thus the injuries and damages account. For these reasons a total \$855,000 has been estimated for 1920. The total for the past four and one-half years and the estimate for 1920 are as follows:

	Injuries and Damages	Percent of Gross Revenue
1915. Actual.....	\$619,593	5.18
1916. Actual.....	871,098	6.63
1917. Actual.....	817,368	5.99
1918. Actual.....	908,019	6.46
1919. 6 mos. to 6-30, Actual.....	374,108	4.80
1920. Estimate.....	855,000	....

### General and Miscellaneous

To this account are charged the salaries and expenses of all general officers, general office employees, legal expenses, stationery, printing and general miscellaneous expenses. The totals for these items have increased during the past few years, due to increase in salaries to general office employees, increase in cost of office supplies and added cost of the fare investigations

including the present proceedings. The totals for this account for the past four and one-half years and the estimates for 1920 are as follows:

	General and Miscellaneous
1915. Actual.....	\$388,691
1916. <sup>▲</sup> Actual.....	630,365
1917. Actual.....	686,190
1918. Actual.....	882,164
1919. 6 mos. to 6-30, Actual.....	130,820
1920. Estimate.....	950,000

#### Toll Bridges and Inclines

To these accounts are charged the expense of maintenance and operation of toll bridges and inclines. The increases during the past few years in these accounts have been due almost entirely to the increased maintenance charges. The totals for these accounts for the past four and one-half years and the estimate for 1920 are as follows:

	Toll Bridges	Inclines
1915. Actual.....	\$ 15,439	\$ 81,828
1916. Actual.....	12,414	78,071
1917. Actual.....	24,715	106,239
1918. Actual.....	46,392	84,548
1919. 6 mos. to 6-30, Actual.....	39,160	41,338
1920. Estimate.....	42,000	97,000

#### Summary of Operating Expense Estimate

A summary of the operating expense estimate for 1920 along with a record of the actual annual expenses from 1911 to July 1, 1919, appears in Table No. V. The Board, in setting up this estimate of operating expenses for 1920, has merely tried to arrive at a figure, from past experience of the Company and from consideration of the present unsettled economic situation, which could be used as a guide in setting up the total annual revenue requirements as an aid to computing the rate of fare required. The Board recognizes the difficulty of making accurate predictions as to the future in these uncertain times, and recognizes further that changes in the conditions assumed would make corresponding changes in actual expenses or future estimates. The Board endeavored to explain in the discussion of the separate accounts the specific assumptions made. In general it was considered that approximately 38,000,000 car miles would be operated and that the same general operating methods and conditions would obtain as were in effect during the first half of 1919. The details of all operating expenses with the basic data from which the 1920 estimates were made are contained in Exhibit R-19.

#### Taxes

The payments by the Company set up under the caption "Taxes" comprise payments to the United States for income taxes, to the Commonwealth of Pennsylvania for taxes on gross receipts, on value of capital stocks and corporate loans, to the City of Pittsburgh for taxes on gross receipts and property, and to various counties and municipalities for property, franchise and other taxes.

In addition to taxes actually paid, other tolls and licenses have been assessed on the Company to a total of \$58,000, payment of which has been withheld and contested to the present time.

Complete data on payments of the nature of taxes made by the Company in the years 1913-1917, inclusive, are contained in Exhibits R-9 and X-16. These statements, however, include cer-

tain items which, although of a character closely allied to taxation, are charged in the accounts of the Company to operating expenses.

The Board has carefully studied the general trend of taxes and estimates the sum of \$600,000 as reasonable for this item in 1920.

The annual amounts paid by the Company and charged by it to taxes during the past four and one-half years, together with the estimate for 1920, are as follows:

	Taxes
1915. Actual.....	\$436,357
1916. Actual.....	490,927
1917. Actual.....	570,815
1918. Actual.....	559,079
1919. 6 mos. to 6/30, Actual.....	284,122
1920. Estimate.....	600,000

TABLE No. V  
Summary of Operating Expenses and Taxes by Calendar Years

	1911	1912	1913	1914	1915	1916	1917	1918	1919	Estimate
	Actual									1920
	1911	1912	1913	1914	1915	1916	1917	1918	6 mos. to 6/30	1920
Maintenance of Way and Structures.....	\$ 1,064,008	\$ 1,071,349	\$ 1,138,233	\$ 1,216,017	\$ 1,080,065	\$ 1,073,154	\$ 1,111,700	\$ 1,194,306	\$ 1,190,585	\$ 1,743,000
Depreciation of Way and Structures.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	465,000
Maintenance of Equipment.....	\$ 16,579	\$ 16,573	746,121	822,254	783,711	733,018	905,660	1,838,078	952,356	1,180,000
Deferred Maintenance Way and Structures and Equipment.....	102,823	130,221	579,798	182,381	160,052	197,277	239,576	9,668	.....	.....
Depreciation of Equipment.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	463,000
Traffic.....	21,756	30,785	20,825	28,499	29,602	29,114	21,568	12,673	18,515	30,000
Power.....	457,207	1,001,517	1,512,981	1,02,011	1,168,623	1,127,373	1,431,646	1,811,617	1,657,355	1,900,000
Conducting, Transportation.....	2,019,875	2,049,235	3,003,624	3,073,196	3,011,440	3,126,016	3,681,850	4,539,189	2,525,385	5,131,000
Injuries and Damages.....	616,596	710,702	815,889	755,818	619,593	571,098	117,368	808,019	37,1,108	855,000
General and Miscellaneous.....	570,617	652,550	508,262	639,170	588,661	630,365	686,190	482,164	430,830	950,000
Total Street Railway Operating Expenses, Deferred Maintenance and Future Depreciation Allowance.....	\$ 7,100,062	\$ 8,235,910	\$ 8,415,733	\$ 8,430,196	\$ 7,471,781	\$ 8,387,415	\$ 9,379,068	\$ 11,066,071	\$ 6,783,325	\$ 13,347,000
Toll Bridges.....	7,664	10,252	13,796	14,803	15,439	12,414	21,715	16,392	39,160	42,000
Indents.....	69,781	90,125	81,702	81,828	78,071	106,239	81,548	41,378	97,000	.....
Total Operating Expenses and Deferred Maintenance.....	\$ 7,177,507	\$ 8,636,567	\$ 8,511,231	\$ 8,529,779	\$ 7,569,048	\$ 8,177,630	\$ 9,510,022	\$ 11,827,011	\$ 6,663,823	\$ 13,486,000
Taxes.....	407,064	438,575	447,684	437,504	436,357	400,927	570,815	539,079	287,530	600,000
Total Operating Expenses and Taxes.....	\$ 7,585,168	\$ 9,075,142	\$ 8,958,915	\$ 8,967,283	\$ 8,065,405	\$ 8,968,557	\$ 10,480,837	\$ 12,386,063	\$ 6,951,173	\$ 11,085,000

## REHABILITATION

The estimated necessary rehabilitation for the four years 1919-1922, inclusive, is as follows:

	1919	1920	1921	1922	Total 4 Years
Track and Paving.....	\$2,133,742	\$2,778,134	\$1,409,419	\$1,855,722	\$ 8,177,017
Cars and Equipment...	237,220	253,768	262,841	344,475	1,098,304
Inclines.....	20,350	14,000	2,000	.....	36,350
Substations.....	1,000	.....	.....	.....	1,000
Shop Tools.....	30,000	40,000	50,000	53,600	173,600
Miscellaneous Equipment.....	5,000	7,500	10,000	13,500	36,000
Bridges.....	206,218	237,590	134,000	125,000	702,808
Buildings.....	57,750	57,750	57,750	57,750	231,000
Total.....	\$2,669,930	\$3,396,092	\$1,938,010	\$2,452,047	\$10,456,079

*Note*—No allowance has been made in the estimates for overhead costs.

The above estimates include the cost of replacements which, in the normal cycle of events, would come about.

The quantities for the track and paving estimates as given are as follows:

	Tangent Track miles	Special Track feet	Paving square yards
1919.....	25.6	13,630	148,800
1920.....	35.0	13,650	196,000
1921.....	13.9	19,990	93,400
1922.....	23.4	9,660	127,600
Total.....	97.9	56,930	565,800

The full details of this summary are shown in Exhibit R-18.

## FUTURE CAPITAL REQUIREMENTS

We estimate that approximately \$1,000,000 per year should be spent on extensions and improvements for the next few years, but such expenditures should be governed by the volume of traffic and the amount of net income applicable to return upon the investment for such purpose.

## CONSTRUCTION AND RECONSTRUCTION 1916, 1917 AND 1918 TO APRIL 1st

During the years 1916, 1917 and 1918, to April 1st, the Company did construction and reconstruction work at a cost of \$718,318 as per the Company's books.

The priced inventory, under Basis No. 3-A, for this same work is \$512,359, or \$205,969 less than the amount actually expended by the Company.

The priced inventory, under Basis No. 2, considers this construction work at actual cost.

### Betterments April 1st, 1918, to July 31st, 1919

From April 1st, 1918, to July 31st, 1919, the Company had reconstructed portions of its track at a cost of \$53,027 in excess of the cost of the equipment replaced.

### Additions to Capital Account April 1, 1918, to date

The additions to the capital account of the system since April 1st, 1918, have been as follows:

	April 1, 1918 to Dec. 31, 1918	Jan. 1, 1919 to June 30, 1919
Way and Structures.....	\$13,804.78	\$1,781.59
Equipment .....	20,124.54	2,669.05
Distribution and Substations.....	14,595.63	5,515.82
Miscellaneous .....	1,511.12	*626.40
	<hr/>	<hr/>
Total.....	\$83,396.37	\$9,330.06
Car Equipment .....		<hr/>
Grand Total.....		\$92,726.43
*Credit		200,000.00

## Contractual Relations

The Pittsburgh Railways System is operated within the separate jurisdiction of upwards of seventy municipalities located in two counties of Pennsylvania under terms and conditions imposed by ordinances and municipal consents relative to construction, maintenance, operation and taxation. Numbers of these municipal consents or contracts accepted by the particular street railway company were given in the early horse car days, others during the period of cable operation, and still others during the early, and up to the present, electrified operation of the railways. As the mode of public conveyance of passengers by street railway transportation developed and advanced and the necessities of public travel on the highways correspondingly changed, the terms and conditions of these municipal grants also differed from the original grants. Now, a situation obtains, with respect to compliance with the terms and conditions of all of these various grants, that cannot be overlooked in the transportation problem because of its cost. Particularly is this true with respect to the widening, straightening, regrading and paving of the public highways along and upon which are located street railway tracks. Another matter that should be considered is the expense for cleaning streets. Also the Company is now obliged to pay tolls on bridges otherwise free for public travel.

The Board is unanimous in the opinion that all such expenditures for street improvements, bridge tolls, etc., add nothing to the facilities for the conveyance of passengers on street cars. On the contrary, they use up money which would otherwise be available in providing better cars, better cleaning, heating, lighting and ventilating, and improved service generally.

The equities in the case appear to this Board to demand serious consideration, tending to the readjustment of contractual relations between the Public and the Company management, under which the municipalities would materially modify the terms of their consents and under which the Company would agree to a partnership in the construction, maintenance and operation of the railway system. Such a course would promote harmonious relations between the parties concerned and create working conditions under which an equitable adjustment of all matters pertaining to the transportation problem would be fostered and promoted.

This course is not a novel one as the Commission is well aware. It is beyond the experimental stage in at least two American cities where an effort is seen to give service at cost, to fix a definite return on definite value, to afford public participation in the management of the transportation system, to remove inequitable tax burdens from the rider, to adjust easily and smoothly the fares to the needed revenues and generally to reward good management.

Having in mind the probability that the principals in this case together with the Public Service Commission will give serious consideration to this aspect of the greater Pittsburgh street railway transportation problem, this Board has excluded from its conclusions, as set forth in its report to the Commission, certain items of future payments in connection with extensive City and County improvements, which it would appear that the Company might have to meet under the terms and conditions of said franchise grants, unless ways and means are to be found for a more beneficial distribution of the costs.

Pittsburgh, Pa.,  
August 6, 1919.

ROBERT M. FEUSTEL  
GEORGE W. FULLER  
J. A. EMERY  
MORRIS KNOWLES  
F. HERBERT SNOW, Chairman

FIPS

63

7

ah company formed  
chart No. 2.

LEASE OR OWNER ASSUMPTION

MILES OF SINGLE TRACK  
December 31, 1916

FUNDED DEBT					
Additional Indebt- edness authorized			Date		
Item No.	Total amount	Amount to retire prior issues	of	Maturity	
(a)	(b)	(c)			
	Our trustee	James		Date 1950	
	-----	(1)			

Info (per initial from	Term	Miles pf single truck	Item No.	Controlled		Total
				but not owed	owned	
	Yrs. from assigned			(t)	(u)	(v)
(r)	(a) (x)	(s)				

## Contractual Relations

The Pittsburgh Railways System is operated within the separate jurisdiction of upwards of seventy municipalities located in two counties of Pennsylvania under terms and conditions imposed by ordinances and municipal consents relative to construction, maintenance, operation and taxation. Numbers of these municipal consents or contracts accepted by the particular street railway company were given in the early horse car days, others during the period of cable operation, and still others during the early, and up to the present, electrified operation of the railways. As the mode of public conveyance of passengers by street railway transportation developed and advanced and the necessities of public travel on the highways correspondingly changed, the terms and conditions of these municipal grants also differed from the original grants. Now, a situation obtains, with respect to compliance with the terms and conditions of all of these various grants, that cannot be overlooked in the transportation problem because of its cost. Particularly is this true with respect to the widening, straightening, regrading and paving of the public highways along and upon which are located street railway tracks. Another matter that should be considered is the expense for cleaning streets. Also the Company is now obliged to pay tolls on bridges otherwise free for public travel.

The Board is unanimous in the opinion that all such expenditures for street improvements, bridge tolls, etc., add nothing to the facilities for the conveyance of passengers on street cars. On the contrary, they use up money which would otherwise be available in providing better cars, better cleaning, heating, lighting and ventilating, and improved service generally.

The equities in the case appear to this Board to demand serious consideration, tending to the readjustment of contractual relations between the Public and the Company management, under which the municipalities would materially modify the terms of their consents and under which the Company would agree to a partnership in the construction, maintenance and operation of the railway system. Such a course would promote harmonious relations between the parties concerned and create working conditions under which an equitable adjustment of all matters pertaining to the transportation problem would be fostered and promoted.

This course is not a novel one as the Commission is well aware. It is beyond the experimental stage in at least two American cities where an effort is seen to give service at cost, to fix a definite return on definite value, to afford public participation in the management of the transportation system, to remove inequitable tax burdens from the rider, to adjust easily and smoothly the fares to the needed revenues and generally to reward good management.

Having in mind the probability that the principals in this case together with the Public Service Commission will give serious consideration to this aspect of the greater Pittsburgh street railway transportation problem, this Board has excluded from its conclusions, as set forth in its report to the Commission, certain items of future payments in connection with extensive City and County improvements, which it would appear that the Company might have to meet under the terms and conditions of said franchise grants, unless ways and means are to be found for a more beneficial distribution of the costs.

Pittsburgh, Pa.,  
August 6, 1919.

ROBERT M. FEUSTEL  
GEORGE W. FULLER  
J. A. EMERY  
MORRIS KNOWLES  
F. HERBERT SNOW, Chairman



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th: INCOME DEDUCTIONS - PITTSBURGH RAILROAD COMPANY - Year Ending December 31, 1916.

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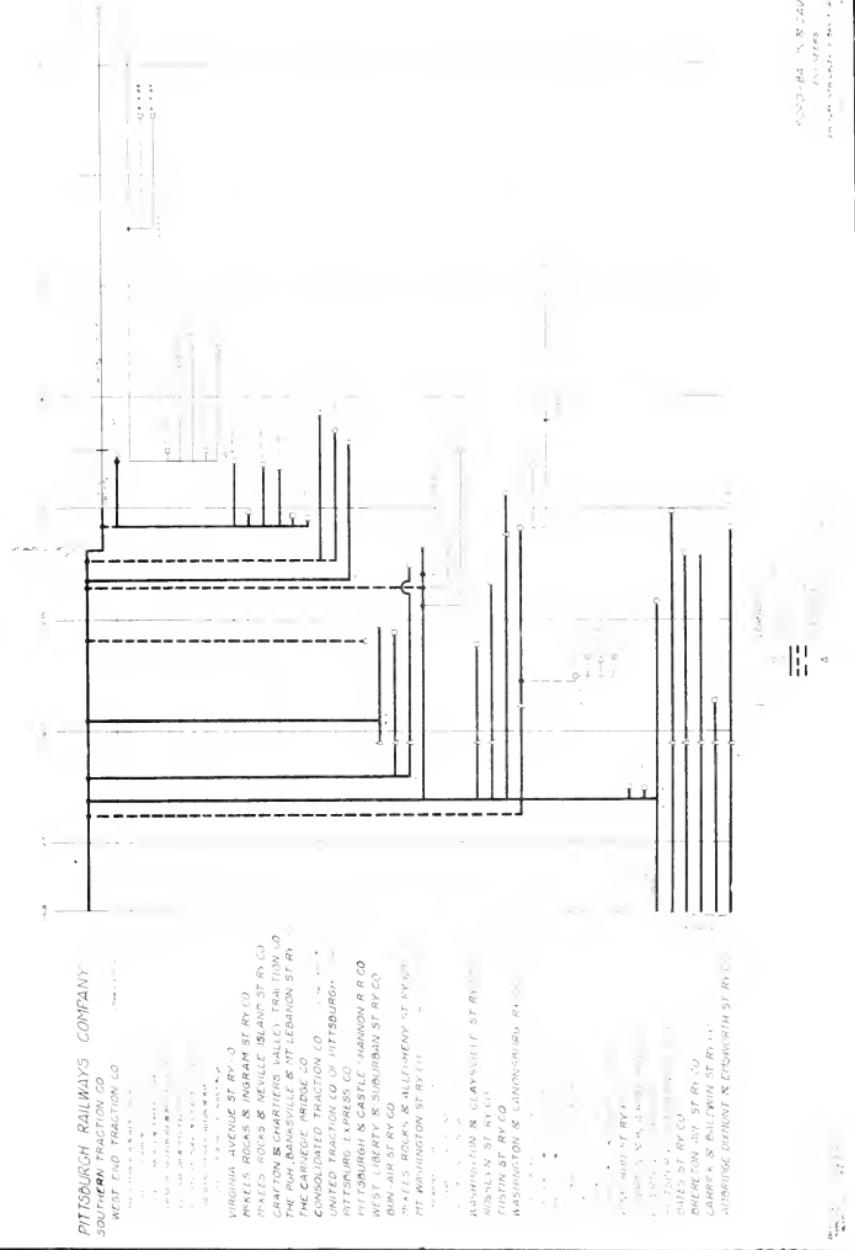
Interest on bonds in which payable able	Par Value (\$)	Rate %	Amount (\$)	Other payable able	Inter- est of Org.	Main- tenance Charges on which payable able	unrestricted Dividends on Stocks			Total Deductions (\$)	Item No.
							(w)	(x)	(y)		
611,000	5-6%		33,750								
4,000,000	5%		200,000								
2,000,000	5%		97,750								
300,000											

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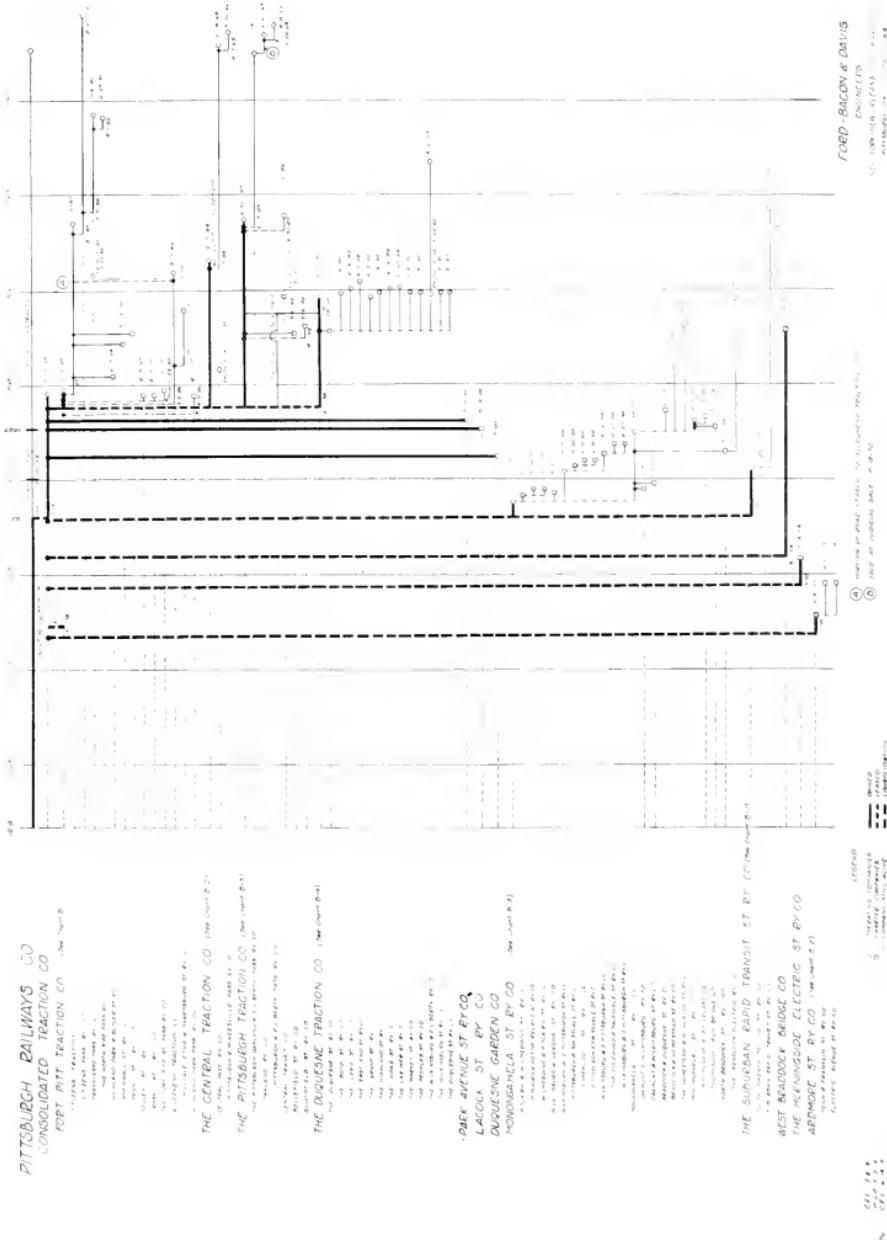
Pittsb  
Augu

PITTSBURGH RAILWAYS COMPANY  
ORGANIZATION CHART

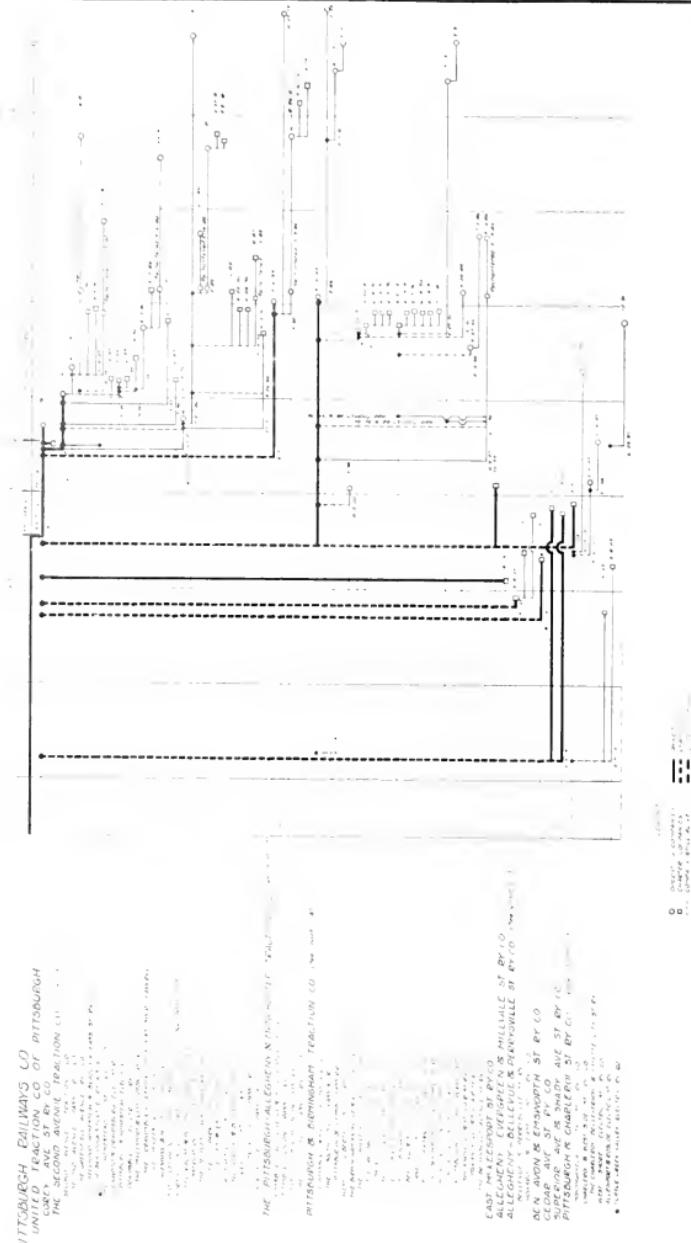


## CHART B

**PITTSBURGH RAILWAYS COMPANY  
ORGANIZATION CHART  
CONSOLIDATED TRACTION COMPANY**



**PITTSBURGH RAILWAYS COMPANY  
ORGANIZATION CHART  
UNITED TRACTION COMPANY OF PITTSBURGH**



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BED-BACON & DAVIS



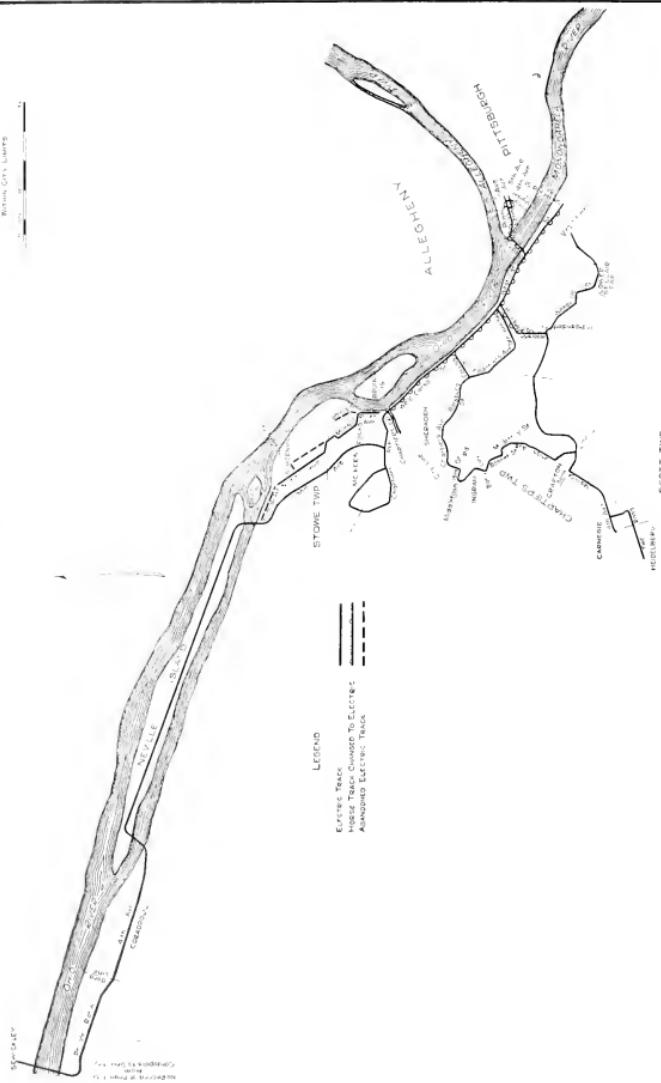
FOUR EASY STEPS TO  
EMPLOYERS  
THE YOUNG ENTREPRENEUR'S GUIDE TO  
DRAFTING A BUSINESS PLAN

FOOD BACON, P. CO.  
ENGINEERS  
New York NEW ORLEANS SAN FRANCISCO  
PHILADELPHIA CHICAGO JUNE 2, 1919

PITTSBURGH RAILWAY'S CO  
HISTORICAL MAP  
WEST END TRACTION CO GROUP

Scale in Feet  
Within City Limits

1000 500 250 125 62 31 15 7.5 3.75 1.875



FORD, BACON & DAVIS  
ENGINEERS  
New York - New Orleans - San Francisco  
Pittsburgh, Pa. - June 29, 1909

PITTSBURGH RAILWAYS CO.  
FRANCHISE MAP  
OF  
WEST END TRACTION CO. GROUP

$$G_{\mu\nu} = \partial_\mu \partial_\nu \Phi - \partial_\nu \partial_\mu \Phi - g_{\mu\nu} \nabla^2 \Phi + \frac{1}{2} g_{\mu\nu} \partial_\lambda \Phi \partial^\lambda \Phi$$



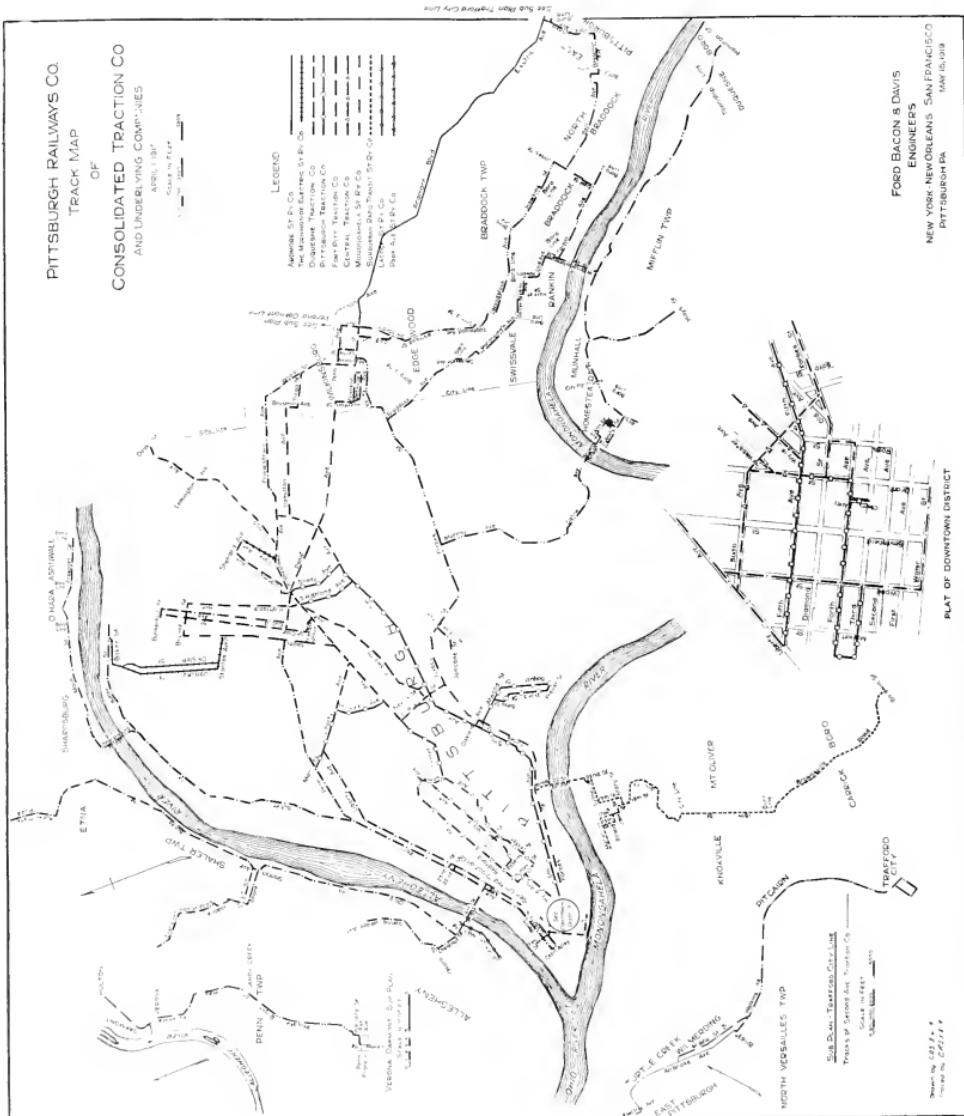
FORD BACON & CO., S.  
ENGINEERS  
Newark, New Jersey, June First, 1911.

PITTSBURGH RAILWAYS CO.  
TRACK MAP

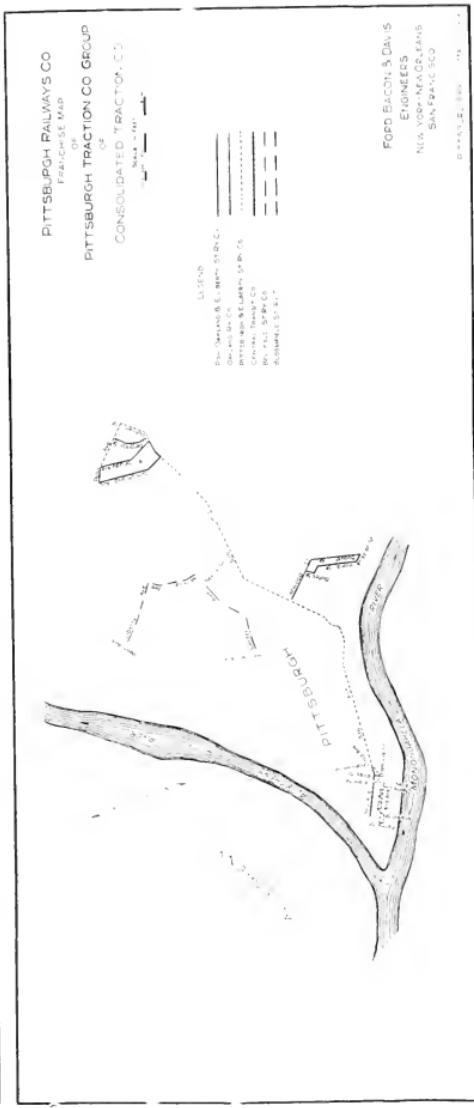
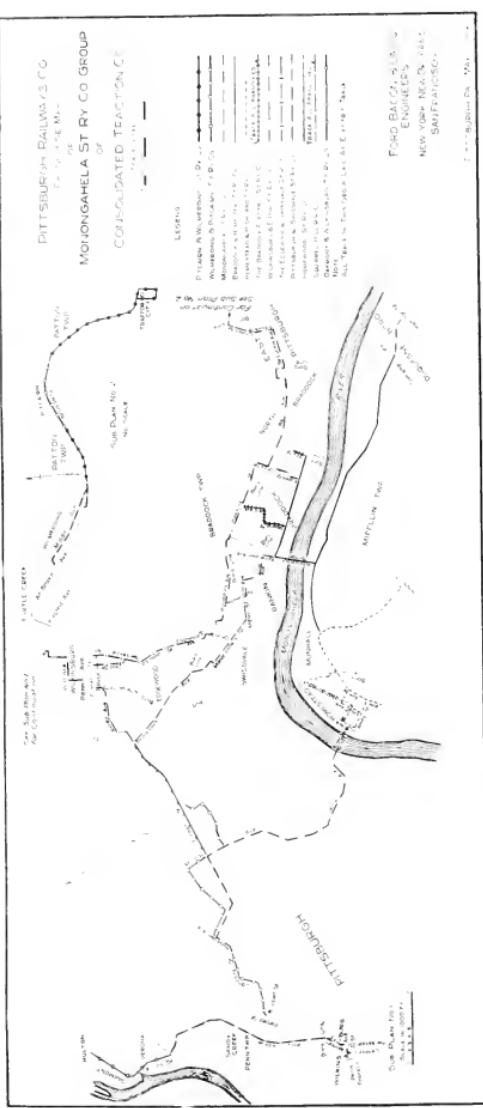
OF  
CONSOLIDATED TRACTION CO  
AND UNDERLYING COMPANIES

SCALE 1 IN. = 1 MILE  
1/62,500

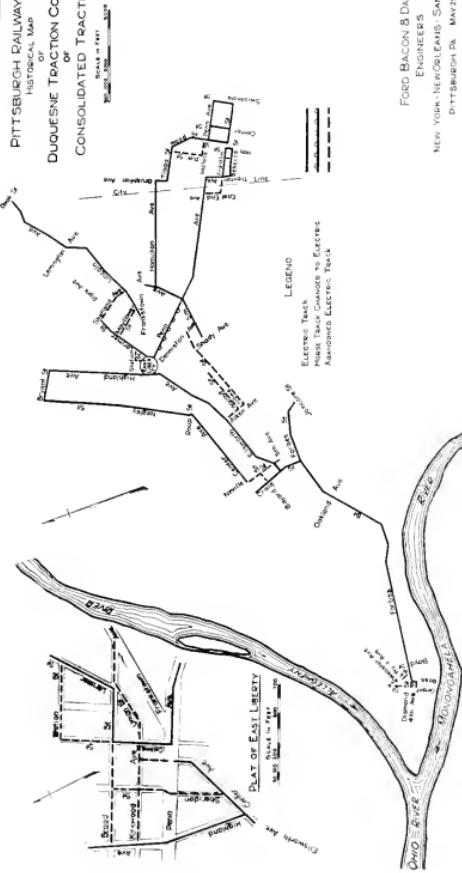
LEGEND  
A. - - - - - Allegheny R. & Co.  
B. - - - - - The Monongahela R. & Co.  
C. - - - - - Duquesne Traction Co.  
D. - - - - - Pittsburgh Traction Co.  
E. - - - - - Penn Ave. Traction Co.  
F. - - - - - Penn Ave. Traction Co.  
G. - - - - - Monongahela Traction Co.  
H. - - - - - Monongahela Ry. Co.  
I. - - - - - Suburban Ry. & Tr. Co.  
J. - - - - - Union Ry. & Tr. Co.  
K. - - - - - Day & Day Ry. Co.



FORD, BACON & DAVIS  
ENGINEERS  
NEW YORK NEW ORLEANS SAN FRANCISCO  
PITTSBURGH PA



PITTSBURGH RAILWAYS CO.  
HISTORICAL MAP  
DUQUESNE TRACTION CO. GROUP  
CONSOLIDATED TRACTION CO.



FORD, BACON & DAVIS  
ENGINEERS  
NEW YORK - NEW ORLEANS - SAN FRANCISCO  
PITTSBURGH, PA. MAY 19 1919

PITTSBURGH RAILWAYS CO.  
HISTORICAL MAP  
DUQUESNE TRACTION CO. GROUP  
CONSOLIDATED TRACTION CO.



FORD, BACON & DAVIS  
ENGINEERS  
NEW YORK - NEW ORLEANS - SAN FRANCISCO  
PITTSBURGH, PA. MAY 19 1919

PITTSBURGH RAILWAYS CO  
FRANCHISE MAP  
OF  
DUQUESNE TRACTION CO GROUP  
OF  
CONSOLIDATED TRACTION CO

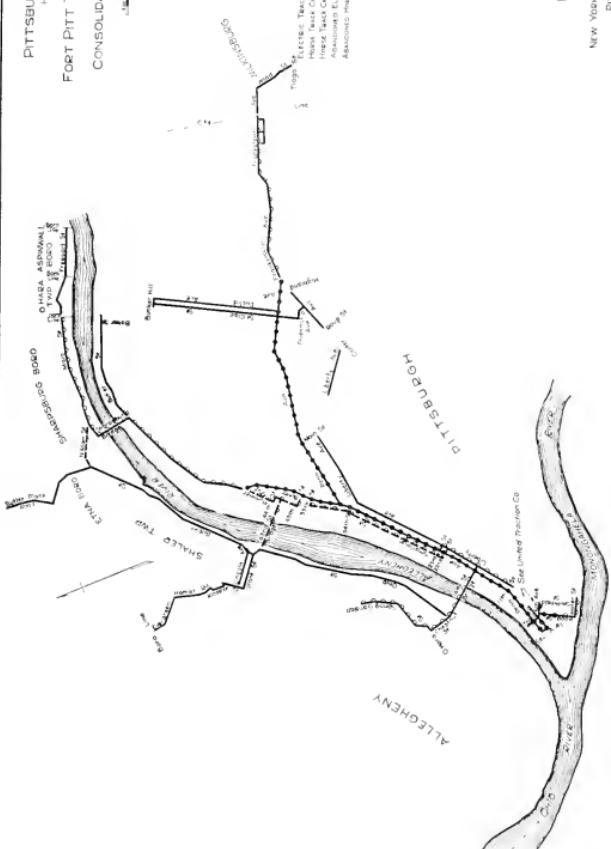
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graph TD
    PR[PIITTSBURGH RAILWAYS CO.] -- "Franchise Tax" --> SRTG[SUBURBAN RAPID TRANSIT CO G]
    SRTG -- "Franchise Tax" --> CTC[CONSOLIDATED TRACTION CO]
    CTC -- "Franchise Tax" --> CTC
  
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THE JOURNAL OF CLIMATE, VOL. 17, 2004

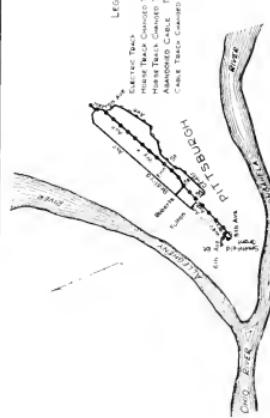
FOOD BACKS & C. S.  
ENGINEERS  
NEW YORK NEW ORLEANS SAN FRANCISCO  
MEXICO CHICAGO MAY 3, 1919

PITTSBURGH RAILWAYS CO  
Historical Map  
OF  
FOOT PITT TRACTION CO. GROUP  
CONSOLIDATED TRACTION CO  
Scale in FEET



FORD, BACON & DAVIS  
ENGINEERS  
New York - New Orleans - San Francisco  
Pittsburgh, Pa. May 29, 1893

PITTSBURGH RAILWAYS CO  
Historical Map  
OF  
CENTRAL TRACTION CO. GROUP  
CONSOLIDATED TRACTION CO  
Scale in FEET



FORD, BACON & DAVIS  
ENGINEERS  
New York - New Orleans - San Francisco  
Pittsburgh, Pa. May 29, 1893



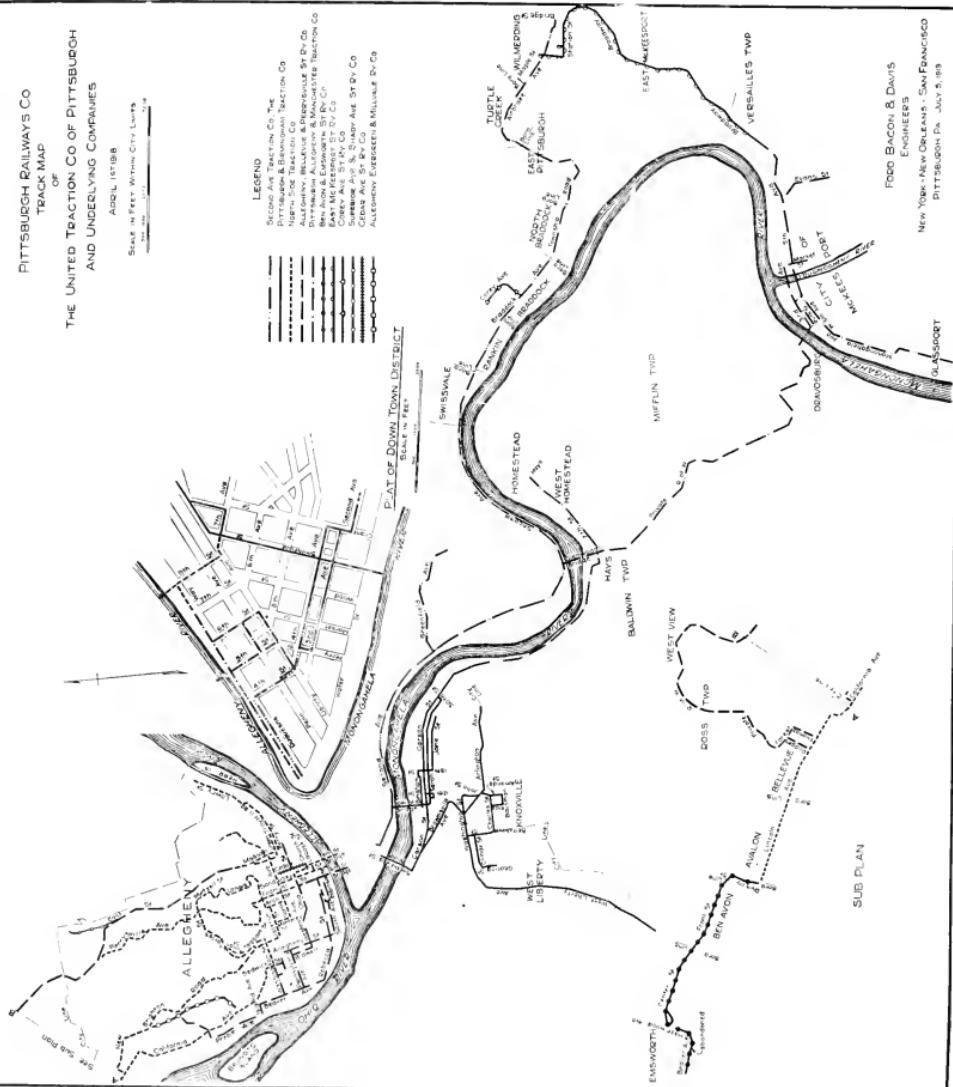
PITTSBURGH RAILWAYS CO  
TRACK MAP  
OF  
THE UNITED TRACTION CO OF PITTSBURGH  
AND UNDERLYING COMPANIES

APRIL 1st 1898

SCALE IN FEET. WITHIN CITY 1 INCH = 1000 FT.  
OUTSIDE CITY 1 INCH = 1200 FT.

LEGEND  
Solid line = Second Ave Traction Co, T.M.  
Dashed line = Pittsburgh & Eastern Traction Co  
Dotted line = Allegheny & Monongahela Ry. Co  
Long-dash line = Monongahela & Monongahela Ry. Co  
Cross-hatched line = East Pittsburgh Ry. Co  
Short-dash line = Spring Hill Ry. Co  
Circles = Allegheny & Monongahela Ry. Co  
Allegheny Express & Mail Line Co

MAP OF DOWNTOWN DISTRICT  
SCALE IN FEET

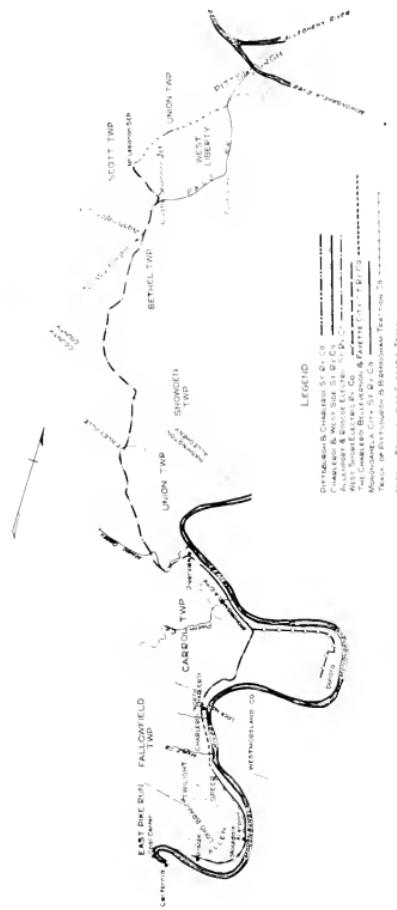


FEDD, BACON & DAVIS  
ENGINEERS  
New York - New Orleans - San Francisco  
PITTSBURGH, PA. JUNE 5, 1898

PITTSBURGH RAILWAYS CO.

FRANCHISE MAP  
of  
PITTSBURGH & CHARLETON ST RY CO Group  
or  
THE UNITED TRACTION CO OF PITTSBURGH

Scale in Miles



LEGEND

- Pittsburgh & Charleton St RY Co
- Pittsburgh & Monongahela St RY Co
- Allegheny & Monongahela St RY Co
- The Charleton & Beloit & Franklin St RY Co
- Monongahela City St RY Co
- Trunk of Pittsburgh & Monongahela St RY Co

Note: Trunk Line & Electric Traction

62

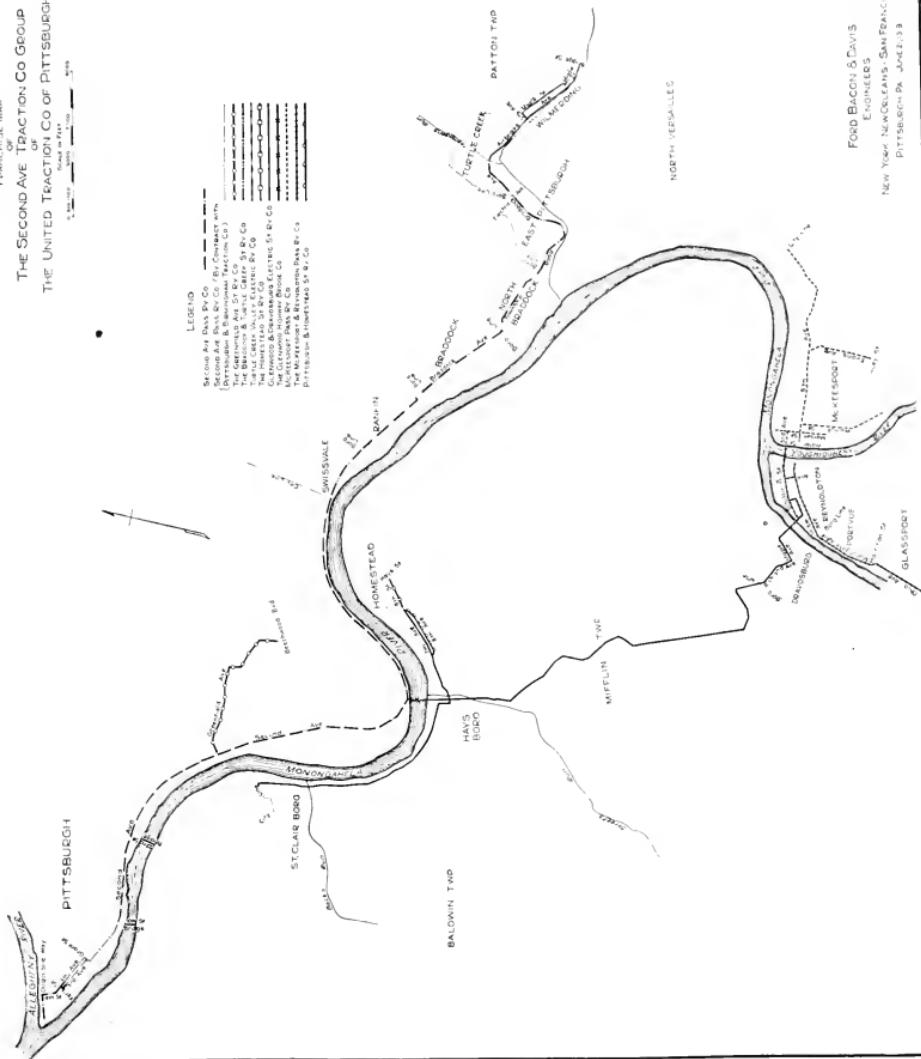
FORD, BACON & DAVIS  
ENGINEERS  
New Orleans, San Francisco  
Pittsburgh, Pa. June 1919



BITTER SWEET DALL WAVE CO

THE UNITED TRACTION CO. OF PITTSBURGH  
THE SECOND AVE TRACTION CO. GROUP  
FRANCHISE MADE  
BY LOOKOUT PARK COMPANY

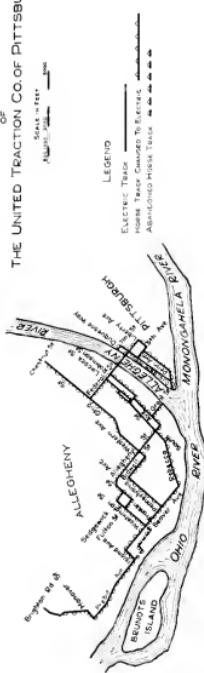
LEGEND



FORD BACON & DAVIS  
ENGINEERS  
NEW YORK NEW ORLEANS - SAN FRANCISCO  
BIRMINGHAM BIRMINGHAM

PITTSBURGH RAILWAYS CO  
HISTORICAL MAP  
of  
PITTSBURGH ALLEGHENY & MANCHESTER TRACTION CO.  
GROUP

THE UNITED TRACTION CO. OF PITTSBURGH



FORD, BACON & DAVIS  
ENGINEERS  
New York, NEW ORLEANS, SAN FRANCISCO  
PITTSBURGH, PA. June 6, 1899

PITTSBURGH RAILWAYS CO.  
HISTORICAL MAP  
of  
NORTH SIDE TRACTION CO. GROUP  
of  
THE UNITED TRACTION CO. OF PITTSBURGH

Scale 1 mile  
1 mile  
1 mile  
1 mile  
1 mile  
1 mile

Electric Tram  
Horse Tram, Chartered to Service  
Abandoned Horse Tram

June 6, 1899

FORD, BACON & DAVIS  
ENGINEERS  
New York, NEW ORLEANS, SAN FRANCISCO  
PITTSBURGH, PA. June 6, 1899



PITTSBURGH RAILWAYS CO

BRANCHES OF  
PITTSBURGH ALLEGHENY & MANCHESTER TRACTION CO.

THE UNITED TRACTION CO. OF BRITISH IRON  
OF

REVIEW ARTICLE

100

Put-in-Bay Amusement Park & Manufacturing Park, R. Co.  
The Blue Union Park, R. Co. Co. Amusement Park, R. Co.  
The Blue Union Park, R. Co.  
The Blue Union Park, R. Co.  
The Blue Union Park, R. Co.

Page 10 of 10

FOOD, BEVERAGE & UTILITY  
ENGINEERS  
New York, New Orleans, San Francisco

ESTATE PLANNING

TRACTION CO. OF  
NORTH SIDE TRACTION CO GROUP  
OF  
THE UNITED TRACTION CO of PITTSBURGH

1770

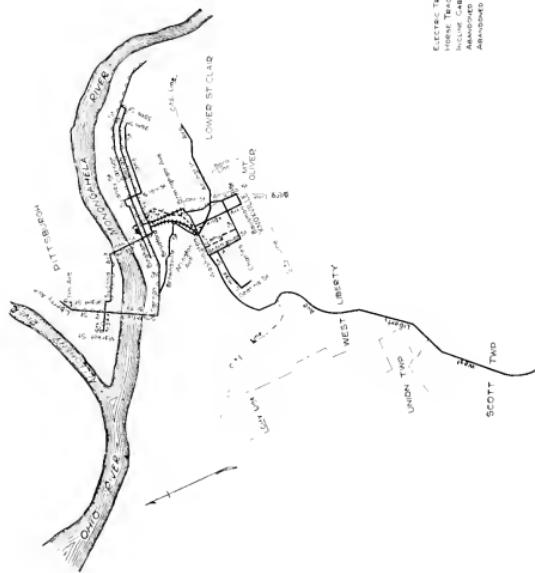
The New-York Post, P. O. Co., New-York, N. Y. & Associated Publishers, 100 Broadway, New-York, N. Y. (1888).

Case 01:00: 8 Court

FORD, DAVISON & DAVIS  
ENGINEERS  
NEW YORK NEW ORLEANS SAN FRANCISCO  
PITTSBURGH PA. Architects

PITTSBURGH RAILWAYS CO  
HISTORICAL MAP  
OF  
PITTSBURGH & BIRMINGHAM TRACTION CO  
GROUP  
OF  
THE UNITED TRACTION CO OF PITTSBURGH

Scale 1 in. Per  $\frac{1}{4}$  mile



LEGEND

ELECTRIC TRAM  
Horse Tram Converted To Electric  
Elevated Track  
Level Track  
Abandoned Track  
Abandoned Horse Tram

FOOTH BACON & DAVIS

ENGINEERS

New York - NEW ORLEANS - SAN FRANCISCO  
PHILADELPHIA - BOSTON - CHICAGO

PITTSBURGH RAILWAYS CO

FRANCHISE MAP  
OF  
ALLENTY BELLEVUE & PERRYVILLE ST RY CO  
GROUP

ALLEGHENY BELLEVUE & PERRYVILLE ST RY CO  
GROUP

Scale 1 mile



FOOD BACON & DA'S

FRANCHISE MAP  
OF  
THE UNITED TRACTION CO OF PITTSBURGH  
ALLEGHENY BELLEVUE & PERRYVILLE ST RY CO  
GROUP

Scale 1 mile

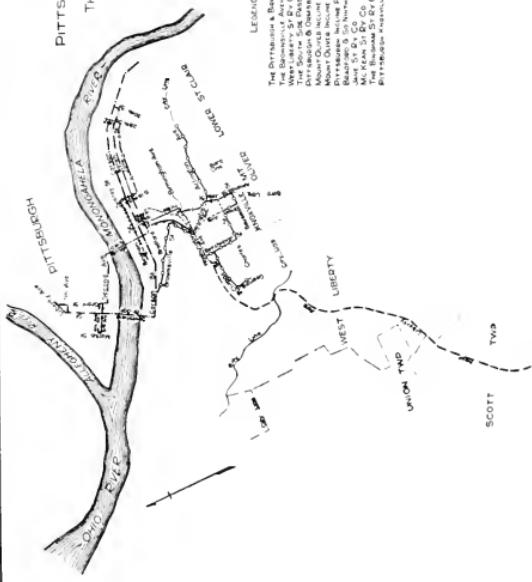
1911 VERSUS 1905 CHARTS, ST. FRANCIS

PITTSBURGH, PA.

PITTSBURGH RAILWAYS CO

FRANCHISE MAP  
OF  
PITTSBURGH & BRIMMINGTON TRACTION CO. GROUP  
OF  
THE UNITED TRACTION CO OF PITTSBURGH

Scale 1 mile



FOOD BACON & DA'S

E. GOLDELR'S

New York, New Orleans, San Francisco  
Pittsburgh, Pa. May 25, 1911



## SEPARATE STATEMENTS

By

ROBERT M. FEUSTEL and GEORGE W. FULLER

### Members of the Engineers Valuation Board Representing the Complainants

The Board, having agreed on certain figures representing Historic Cost, Cost of Reproduction of the property on different price bases, and certain other items which enter into a determination of the rate base, were unable to agree on the weight which should attach to each of these factors in arriving at a rate base. The representatives of the municipalities, therefore, wish to record their opinion on the fair rate-making value and on some of the important factors used in arriving at this value.

Basis No. 1, the Historic Cost, according to the report of the Board includes the fair cumulative investment in all physical property from the date of the first horse car line in 1858 to April 1, 1918. The figure includes, therefore, the complete investment in horse car lines, cable lines, early experimental electric lines and power houses no longer used, as well as all of the present electric system. This investment figure contains a reasonable amount for structural overheads and also for working capital comparing with similar items considered under cost of reproduction estimates.

As stated in the report on Historic Cost, it was difficult to determine in some cases the exact nature of the transactions recorded. The total investment figure does not contain allowances for promoters' profit beyond the organization costs, nor allowances for payments in excess of the value of the plant for properties bought on an earnings basis. On the other hand no deductions were made for losing ventures which were sold at foreclosure, for the first experimental electric lines nor for any lines which may have been built without regard to real transportation needs, either as to time or place. The bad was taken with the good to arrive at some measure of about what total money had been put into the building of all the physical plant for the entire period. The total figure arrived at is \$59,069,382. Of this total amount, the property in the form of horse car, cable lines and early electric lines, long since superseded, was estimated to be \$11,271,458, which when deducted leaves \$47,797,924 as the total historic investment in the present existing physical property.

The computations made from the books show that an average return of 7.1% was earned over the entire period providing for only such depreciation as had been charged to operating expenses. This calculation of return, however, was made on the entire property including all companies and thus carries in the operating losses of the poor companies no matter how they were built, and these losses are matched against the gains of the successful companies. In the competitive days, there were numerous duplicating lines built solely to acquire an entrance or to compete with some older and successful company. This is evidenced by track which, at the present day, is unused for regular service.

There is, therefore, a historic investment in existing property of \$47,797,924 as determined from the records, and an estimated accrued depreciation thereon of about \$12,000,000. Computations made from the books show that an average return of 7.1% was earned on all the property investment ever made, which cumulative investment amounted to \$59,069,382 in 1918.

If both superseded property and accrued depreciation be deducted from the Historic Cost as found, the resulting figure will be \$35,758,324. Such a reduction would immediately raise the claim that the business had not earned a sufficient amount to take care of retirements and accrued depreciation, but only an average of 7.1% based on the actual operating charges set up. That claim raises the question as to whether or not there ever was any obligation on the part of the public to guarantee that a utility should earn a fair return. On a purely competitive basis, a company would be entitled to whatever return it could get, and on the other hand, would have to assume all of the risks of the business, including failure to earn depreciation charges. If, however, a company claims that it should not suffer the depreciation and retirement losses for any part of the

entire period, then the enterprise must be regarded on the public agency basis, and the return on the investment must be viewed from that standpoint.

The rate to be assumed under a public agent basis would, we believe, have approximated the rate earned on the best secured bonds over the same period. The range of interest rates of the highest grade railroad bonds over that period was from 4% to 6%, with an average, in our judgment, of not over 5%. The contract of the Cleveland railways, made in 1908 with the city, on a partial guarantee basis, is at the rate of 6%, and that of the Boston Elevated Railroad, made in 1918 with the Commonwealth of Massachusetts, on an absolute guarantee, is at an average rate of 5½% despite the high rates of interest obtaining in 1918. Considering all of the circumstances, we believe a 6% rate to be fair to assume in this case if the public agency basis is used.

If the agency basis had been applied throughout the history of the property on a 6% rate, the surplus earnings in excess thereof could have been applied to offset superseded property and thereby the capital amount would have been reduced from year to year. Such a calculation would show the retirements of superseded property provided for out of surplus earnings and any additional surplus which could be considered in connection with existing depreciation. This calculation has not up to the present time been made.

On the basis of a 6% return each year on all the property investment ever made, there is a total surplus accumulation at April 1, 1918, of \$12,617,044; and if compound interest at the rate of 6% be computed on the surplus or deficit accumulations year by year the total surplus is \$41,526,129.

The non-compounded surplus (namely \$12,617,044) would more than offset the unamortized investment in horse car, cable and early electric lines.

By way of illustration, it may be noted that the cumulative surplus earned up to 1902 on the 6% basis was \$4,554,151, and at least to that extent superseded property could have been written off the plant account. This would have reduced the total investment on which the 6% return was calculated for all later years and would have materially increased the surplus in 1918.

Instead of slighting maintenance and renewals in the early years before 1910 and again after 1913 when the returns were good, sufficient money could have been expended; and the property would not be as we find it today with excessive deferred renewals to be taken care of at prices more than 50% increased.

Considering only the \$12,617,044 surplus at a 6% non-compounding rate and deducting this from the \$59,069,382 there remains a total investment in all properties of \$46,452,338 as the maximum present investment in both property and foregone returns. This figure includes the actual cost of developing the business including fair costs for organization and consolidation. The figure also includes \$1,400,000 representing cost of land, such as old power station sites, unused portion of Duquesne Garden, farms and other parcels not now used in the railway business and which should not be included in a rate base. Deducting this amount the net sum is \$32,052,338. This figure, in our opinion, is the maximum which can be considered from a historic standpoint as the fair cost of present property and business.

The Cost of Reproduction under Basis No. 2, which represents an estimate for reproducing new all of the present property under original conditions by applying the prices that were current when the particular item was installed, amounts to \$49,324,791. This figure would be taken directly from the company books if records were kept in such form—that is to say, if property were written off as soon as retired and if in renewal work the cost of the worn out item were deducted and the net cost of the replacing item were substituted therefor. The figure, as estimated, can be used to check the figure obtained in Historic Cost. When the retirements are deducted from Historic Cost, to leave property comparable to that appraised in Basis No. 2, the results check very closely.

The amount of accrued depreciation on this basis is \$12,039,600 and total estimated cost new, less depreciation, is \$37,285,191. If the unused land to the amount of \$1,400,000 is deducted, there

remains \$35,885,191 as the cost new, less accrued depreciation, of the present physical property devoted to street railway uses. In the total cost new, under this basis, is included all of the work done up to April 1, 1918, so that any actual construction work done during the high price period is included at these prices.

The Cost of Reproduction under Basis No. 3A, which represents an estimate for reproducing new all of the present property under original conditions by applying the average prices current during the period 1906-1915, amounts to \$56,148,398. The total accrued depreciation on this basis is \$12,733,100 and the cost new, less depreciation, is \$43,415,298. The unused land amounts to \$2,365,842 and the cost new, less accrued depreciation, of the present physical property devoted to street railway uses is, therefore, \$41,049,456.

The Cost of Reproduction under Basis No. 3B, which represents an estimate for reproducing new all of the present property under original conditions by applying prices which are indicated for 1918 from the trend of prices for 20 years previous to 1916, amounts to \$60,832,200. The attempt in this calculation was to determine what prices probably would have been in 1918 had the World War not occurred and to apply the prices thus indicated for the one year 1918. The total accrued depreciation in this basis is \$13,869,700, and the cost new, less depreciation, is \$46,962,500. The value assigned to unused land under this basis is \$2,369,700 and the cost new, less accrued depreciation, of the present physical property devoted to street railway uses is, therefore, \$44,592,800.

The Cost of Reproduction under Basis No. 3C, which represents an estimate for reproducing new all of the present property under original conditions by applying the average prices current during the period 1914-1918 inclusive, amounts to \$73,560,300. The attempt in this calculation was to determine what the probable cost would have been under average prices for the five years immediately prior to the date of inventory. This period covers the full effect of all the high prices incident to the war. The total accrued depreciation on this basis is \$16,845,200 and the cost new, less depreciation, is \$56,715,000. The value assigned to unused land under this basis is \$2,440,000, and the cost new, less accrued depreciation, of the present physical property devoted to street railway uses is, therefore, \$54,275,000.

The Cost of Reproduction under Basis No. 3D, which represents an estimate for reproducing new all of the present property under original conditions by applying the average prices estimated for the period 1918-1922, inclusive, amounts to \$84,191,300. The attempt in this calculation was to estimate what the cost would be under average prices for the five years immediately following the date of inventory. The total accrued depreciation on this basis is \$19,364,000 and the cost new, less depreciation, is \$64,827,300. The value assigned to unused land under this basis is \$2,452,400 and the cost new, less accrued depreciation, of the present physical property devoted to street railway purposes is, therefore, \$62,374,900.

The Cost of Reproduction under Basis No. 4, which represents an estimate for reproducing new all of the present property under present conditions by applying the prices estimated for April 1, 1918, amounts to \$102,842,274. The total accrued depreciation on this basis is \$23,775,500 and the cost new, less depreciation, is \$79,066,774. The value assigned to unused land under this basis is \$3,997,734 and the cost new, less accrued depreciation, of the present physical property devoted to street railway uses is, therefore, \$75,069,040.

In estimating costs of reproduction new, the first intention of the Board was to make calculations only on Basis No. 2, 3A and 4. Later, estimated percentages were applied to Basis No. 3A to obtain totals under the assumptions made for Bases No. 3B, 3C and 3D.

The Public Service Law, in its mention of estimated reproduction cost, uses the term "fair average prices." The customary practice in cost of reproduction estimates in the past has been to use an average of prices prevailing for a five or ten year period prior to the date of valuation. The date of this valuation was April 1, 1918, and any average which includes prices of 1916-1918 reflects all of the violent increases incident to the war.

We believe that the average prices for the ten year period 1906-1915, as used in Basis No. 3A, represent what should be termed fair average prices. This, we believe, does substantial justice, especially in view of the fact that very little construction work was done under war prices and that all of the actual construction work done during the high price war period is carried in at those prices under Bases No. 1 and 2. It is our opinion, therefore, that while academic interest may attach to the results obtained under Bases No. 3B, 3C, 3D and 4, the results have no serious weight in the consideration of a rate base. The present high prices will have their real effect in the cost of future replacements and have been provided for in the increased allowance in operating expenses for 1920, but they can in no sense add to the actual cost of the present property which was installed at a time when these prices did not prevail. The most important item in our opinion is the fair amount of money in property now devoted to the use of the public.

Under Basis No. 1, the Historic Cost new of present existing property now used for railway purposes is \$46,397,924. Under Basis No. 2 the estimated cost new, using an inventory of the same property, the total is \$47,924,791. These figures result if no accrued depreciation is deducted. Using Basis No. 3A, average 1906-1915 prices, the comparative figure is \$53,782,556. These figures are all for cost new, with deductions made for land not now used for railway purposes, but with no deduction made for abandoned track or track being operated for franchise purposes.

All the figures used in the foregoing discussions relative to total historic cost, total estimated costs of reproduction new, total accrued depreciation and surpluses on 6% return basis appear in the signed report of the Board and were unanimously agreed to.

In considering Going Concern Value as applied to either the Historic or Reproduction Cost totals, we believe that the way in which a property has been operated, the amount of return earned and the prospective earnings are all important elements in the determination. A well managed prosperous public utility enterprise is a decided asset to any community. The owners of such a utility deserve to share in the natural prosperity which has come to the business as well as in the special economics created by efficient management.

In this case, the consolidation of the properties into a unified system made possible better service and no doubt lower costs to the car rider in general. Unfortunately, this consolidation was connected with the issuance of securities in the nature of bonds and guaranteed stock to an amount above the actual cash in the property. The promotion stock, of course, was in addition to these amounts. The existence of some promotion stock is a necessary part of financing in the speculative field if the bonds are to be sold at the prevailing interest rates. The operation in this case, however, presents the story of a greater amount of fixed obligations than should have existed and some payments of dividends on promotion securities at the very time when maintenance and renewals were being neglected.

The period of 1902-1909 was the period of enthusiasm in the street railway field. During that period the probable effect of the new economic factor—the automobile—was not understood, and railway managements generally did not recognize the growing immutable needs for money for renewals. Much of the property had not reached the end of one full cycle of life, and the earnings were considered as available for dividend disbursements when certain renewals were neglected and future renewals wholly unprovided for. Large expenditures were made for extraordinary renewals and maintenance from 1909 to 1913 on the property of this Company. From that date on, however, an insufficient amount was expended. The war, with the tremendous increasing prices and the full effect of the automobile, served to give the final blow to this enterprise. The actual cost of hauling passengers, especially under the flat fare system, would no doubt have been greater than five cents even with all conditions favorable as to fair fixed charges and condition of property. With the conditions as they were the difficulties were greatly augmented.

We have sketched this brief history of operations from 1902 to 1918, because we believe that Going Concern Value, or Going Value, as it is sometimes called, is not a value which inherently attaches to all properties. This value, we believe, exists primarily where the business is showing favor-

able earning possibilities as a result of the efficient way in which the whole enterprise has been built up and operated.

We do not believe that the earnings of the past, taken as a whole, or their possibilities as to the future, warrant any conclusion that there is an additional value which should be added to this property; nor do we believe that the methods used and results obtained in building up this enterprise warrant an addition to the rate base for Going Concern Values. Such an item may have been applicable in earlier days but if so the sum has in our opinion now become a negligible quantity.

The Board prepared estimates of the probable loss of return during early years of operation considering the reproduction of the business as well as the physical property. These amounts were approximately one full year's loss of interest on the entire investment as determined under the different bases. The total estimated loss of interest for Basis No. 3A is **\$3,400,000**. This amount, which is in reality the estimated cost of developing the business, is approximately one-fourth of the accrued depreciation estimated for Basis No. 3A. It could not, therefore, act as more than a partial offset to this accrued depreciation with which it must be considered, if the property and business is to be reproduced in its present condition.

From Exhibit R-18 prepared by the Company's engineers, we find that 109 miles of track is set up as the amount which requires complete rebuilding in the next four years. The average amount of track reconstructed from 1908 to 1917 was 10 miles per year. If the same rate were followed for the next four years, 40 miles would be the normal amount and 69 miles, of the total estimated, the amount due to past failure to renew. We believe that the average of 10 miles per year was not sufficient in the past, and that 15 miles per year is a minimum which would be required for paved track at the present time. This would leave 49 miles as an assignment against past years. This mileage must now be replaced at the present high prices. The cost of replacement of track structures of the same specifications but at present prices is approximately **\$45,000** per mile.

In addition to the track and paving replacement, there are needed extra repairs on bridges and replacement of cars now included in the inventory but which are not serviceable.

We are of the opinion that at least **\$2,500,000** of the abnormal maintenance and renewals should be taken care of by the Company out of its returns instead of being charged to operating expenses.

In view of all these considerations, it is our opinion that the rate base should not be greater than **\$48,000,000**.

A fair rate of return to apply to this base we believe to be **7%**. Such a return on the total valuation, if the money were raised sixty per cent. from bonds and forty per cent. from stock, would give a return of **6%** on bonds and **8.5%** on stock.

#### TOTAL REVENUE REQUIREMENTS

The agreed revenue requirements for operating expenses and taxes were **\$14,086,000**. In this item allowance was made for depreciation and the present high cost of labor and material, but no allowance was made for any increase in wages which may be granted by the War Labor Board. The rate base does not consider capital expenditures made since the date of valuation. The operating expense allowance did consider the cost of the present rate proceedings.

The total current annual revenue requirements of all kinds we believe to be **\$17,446,000**. This total for **250,000,000** passengers would require seven cents per passenger on a flat fare basis. We believe that where increases on a flat fare basis have not produced the required revenue without placing an abnormal burden on the short haul rider, earnest consideration should be given to a trial of zone fares.

The solution of the street railway problem, in our opinion, will not come with the mere setting down of fixed charges that are reasonable under all the circumstances on the amount invested.

The amount paid in street cleaning assessments, bridge tolls, paving renewals and in direct taxes to both the municipalities and the State, are all included in the operating expense allowances. These charges are all a natural part of the historic and existing arrangement between the Company and the public.

The real need, in our opinion, is for some contract arrangement between the public and the Company, which would be based on the reasonable assurance of securing all necessary charges, including a return on investment.

We have recommended a return of 7% on the assumption that future operations would be on the same basis as the past—that is to say with no more direct contract relationship than now exists. However, we are absolutely convinced that a contract relationship between the Company and the public should be established at the very earliest moment. Under such a contract, whereby some measure of guarantee of return could be devised, we believe that 7% return is too high and that a rate comparable with those in effect in the Cleveland, Cincinnati, Boston and Dallas contracts would be proper.

ROBERT M. FEUSTEL,

**Concurring Statement of George W. Fuller.**

I concur in the above statement of Mr. Feustel as to rate base and rate of return. His discussion, however, is slightly at variance with my views in a few particulars, and hence my decision to summarize briefly my conclusions as follows:

1. This property shows a historic cost of..... \$59,069,382  
From this should be deducted for superseded property.. \$11,271,458  
and also for unused land..... 1,400,000 12,671,458  
\$46,397,924
2. The estimated costs of reproducing new the inventoried property under original conditions and eliminating unused land are:  
Basis No. 2—Historic unit prices..... \$47,924,791  
Basis No. 3A—Average (1906-15) prices..... 53,782,558
3. Available data show that an average return of 7.1% was earned over the entire period on the entire property (of a total historic cost of \$59,069,382) considering together the good companies and the poor companies, the good periods and the bad periods, and considering superseded property and depreciation only in so far as the latter had been charged to operating expenses. In the light of this evidence and other results of performance I do not consider that this property is entitled to loss of interest during operations or to going concern value or development expenses provided depreciation is taken care of as stated in the next paragraph.
4. This property showed deferred maintenance and renewals on the date of appraisal to an extent aggregating fully \$2,500,000. With these expenditures made, there would have remained a difference between the estimated cost new and estimated cost new less depreciation of about \$10,000,000. This sum, corresponding to the difference between conditions new and normal working conditions of a well seasoned property, is sometimes called *decretion*. We are

unfortunately not in a position at the present time to determine finally the surplus earnings upon different rates of return if superseded property had been amortized or offset by surplus earnings from year to year. Such a tabulation would show the surpluses available for superseded property and also what, if any, for the surplus was available to offset existing depreciation. In considering historic cost or investment, I am of the opinion that to the extent that depreciation has been made up by surplus earnings, it should be deducted and to the extent that it has not been earned it should not be deducted. If it should be deducted when not earned, then I am of the opinion that, in considering the historic cost of the property and business and in determining a fair rate base, a corresponding sum should be added as development expense or going concern value. The amount should appear in the rate base once, but only once. This view is not novel and needs no detailed discussion. Such is found in the decision of the Wisconsin Railroad Commission in *re Milwaukee Electric Railway & Light Co.*, P. U. R. 1918E p. 26 and also at great length in the Report of the Special Committee, of the American Society of Civil Engineers, to Formulate Principles and Methods for the Valuation of Railroad Property and other Public Utilities, 1916, pp. 1851-60, 83 and 95.

5. Considering the foregoing and other elements, I am of the opinion that the fair rate base should not exceed \$48,000,000.

6. A rate of return of 1% on the above rate base is fair in my judgment. The liberality of this rate and the allowance made for promotion and management appears when we consider the actual returns on the existing securities of the underlying companies. The annual return on the funded debt is \$2,162,531, on \$42,945,133 of bonds or a trifle over 5%. The annual return on outstanding stock covered by guaranteed rentals averaged less than 5%.

7. As to new money for extensions and betterments I assume that its actual cost will appear in the future revenue requirements.

8. I am aware that the rate base above stated makes but little allowance for cash or securities paid for promoters profit (in excess of ordinary organization expenses) or cost of car lines bought on an earnings basis (in excess of cost of physical property) or for land above the fair reasonable value thereof when such land is used for rights of way by lines connected with land development schemes. In view of all existing conditions I believe such items should be eliminated from the rate base, or, if included in any measure, the added sum should cause a proportionate decrease in the rate of return below 7%.

9. As to appreciation of plant account by reproduction estimates of cost using present conditions or such prices as to labor and materials as reflect to a greater or less extent the influence of the world war, it is my view that they should not appear in the rate base.

Furthermore, substantial justice is done by considering the historic cost as I have outlined and it should be further noted that the present company is in default of service and contractual obligations as stipulated by its franchise requirements. Further, this Company has allowed its property to reach a run-down condition due in part to the diversion of revenue to the payment of rentals, rather than to renewals which must now be met at greatly increased cost; and has apparently reached with its fare schedules a point where the law of diminishing returns will produce substantially no more income with even higher rates of fare. Without attempting to discuss the

significance or the permanence of this aspect of appreciation of plant account in excess of investment it is my conclusion that addition in the rate base of this property because of the elements of appreciation shown by reproduction costs by Basis Nos. 3B, 3C, 3D and 4, should be attended by a corresponding decrease in the rate of return as set forth above in paragraphs 5 and 6. (See Whitten, page 649, *in re Interdependence of Rate Base and Rate of Return*.) Furthermore, from this viewpoint full allowance should be made for existing depreciation.

10. In my judgment the first requisite of this proposition is to provide good service and the cooperative efforts of all concerned should be directed expeditiously to that end. Actual investments of the past should be respected and steps taken to safeguard the necessary return on the new money needed for imperative rehabilitations, extensions and betterments.

GEORGE W. FULLER.

SEPARATE STATEMENT  
By  
J. A. EMERY and MORRIS KNOWLES

**Members of the Engineers Valuation Board Representing the Respondents.**

In forming our opinion of the rate base, we hold in view on the one hand the actual cost, and on the other hand the reproduction cost "based upon the fair average price of materials, property and labor."

**Historic Cost**

The Board has, from its historical study, found the actual cost of the physical property to have been:

Actual expenditures for physical property as agreed upon by the Board, . . . \$59,069,382

In addition, actual payments in cash and bonds were made to bring the properties into a unified system economical for the public and the companies and for related purposes:

Additional cash and bond payments, . . . . . \$12,198,572

We have had made a careful investigation of the records of these actual payments in cash and bonds made to bring the properties into a unified system and believe that these records are clear as to at least \$6,000,000 cash put into the property for this purpose by those who prosecuted its development. In this investigation special care was taken to exclude transactions where the property value transferred was not clear and equal in our opinion to the amount of payment.

Throughout the entire history of the industry in Pittsburgh, the average return as found by the Board upon the investment in physical property alone has been 4.1%. From our study of the history of this Company and our knowledge of public utility investments in this period, we do not believe that the money necessary to produce or reproduce the property of the Pittsburgh Railways System could have been secured at any time on an expectation of less than 5% annual return. We, therefore, believe that neither the present company nor the preceding companies considered as one system could have charged off the superseded horse car, cable and early electric systems, to say nothing of the accrued depreciation of parts of the present physical property and at the same time have maintained their credit for the development which was required of them by paying a proper and reasonable rental for the capital required.

We, therefore, believe that the actual money now in the service of the public served by the Pittsburgh Railways System is at least \$65,000,000, covering its physical property, developmental and going value, consolidation value and all other elements of value represented by actual expenditures.

**Reproduction Cost**

We believe the intent and meaning of Cost of Reproduction in all cases where it is used as a measure of value, to be as of the date of valuation.

The various estimates of cost of reproduction new of the physical property prepared under the supervision of and agreed to by the Board and the only ones applicable in any sense to April 1, 1918, are:

Basis No. 3 B—Estimated cost of reproduction new at prices indicated for 1918 by the trend of prices for 20 years previous to 1916, and under original conditions of construction, . . . . . \$60,832,200

Basis No. 3 C—Estimated cost of reproduction new at average prices of the period 1914 to 1918, inc., and under original conditions of construction....	\$ 13,560,300
Basis No. 3 D—Estimated cost of reproduction new at average prices of the period 1914 to 1918, inc., and under original conditions of construction....	\$ 84,191,300
Basis No. 1 —Estimated cost of reproduction new at prices and under the conditions ruling at the date of valuation, viz., April 1st, 1918.....	\$102,842,274

In arriving at cost of reproduction at the fair average price, we believe that Basis No. 3 C best satisfies the spirit and intent of the law and of valuation practice, as it is based on an average for five years preceding the date of valuation, which is sanctioned by custom and decisions in Pennsylvania and elsewhere. We believe that Basis No. 3 B should be considered as an absolute minimum, representing as it does, prices which might have prevailed in 1918 if there had been no war. We believe that consideration should also be given to Basis No. 3 D, based on an average for five years commencing with the date of valuation.

The investors in this property themselves have been subjected to the grinding difficulties of war conditions and money inflation, so that hardship and injustice would be done them if no account whatever be taken of conditions as they are.

In Mr. Emery's opinion the cost of reproduction of the property of the Company would be as follows:

Estimated Cost of Reproduction under various Interpretations of "The Fair Average Price" of all Property to be Supported by Income from Railway Operation.

	Basis 3 B	Basis 3 C	Basis 3 D
Cost of reproduction new of physical property as estimated by the Board.....	\$60,832,200	\$13,560,300	\$ 84,191,300
Additional cost of reproduction:			
Developmental Value (Loss of return during early years of operation as calculated by the Board).....	3,800,000	4,900,000	6,000,000
Consolidation Value.....	6,000,000	6,000,000	6,000,000
Going Concern Value.....	5,000,000	5,000,000	5,000,000
<hr/> Total.....	\$15,632,200	\$89,460,300	\$101,191,300
Less			
Property not to be supported by income from Electric Railways Operation.....	\$ 701,182	\$ 701,182	\$ 701,182
Abnormal Accrued Depreciation of Parts..	1,269,314	1,269,314	1,269,314
<hr/> Total Deduction.....	\$ 1,970,496	\$ 1,970,496	\$ 1,970,496
Net Cost of Reproduction New of all property to be supported by Electric Railway income .....	\$13,661,704	\$87,489,804	\$ 99,220,804

In reaching his opinion as to the estimated cost of reproduction, Mr. Emery considers that, in the reproduction of a fully seasoned electric railway in normal operating condition, the total depreciation in wearing value of parts, which accrues before a complete cycle of renewals has been made, is an essential part of the cost of the physical property as it exists. In the past, some Commissions and Courts have arrived at fair value for rate making purposes by deducting

from the estimated cost of reproduction new the accrued depreciation of the parts. It is the opinion of Mr. Emery that the amount of the accrued depreciation of the parts represents the cost of seasoning the property and this cost cannot properly be absorbed by the fares during the period when the density of traffic is below that which the road is constructed to accommodate at that point when it can pay its own way.

Mr. Knowles presents for consideration under the head of cost of reproduction in arriving at fair value, the following:

Estimated Cost of Reproduction less Accrued Depreciation of all Property to  
be Supported by Income from Railway Operation.

	Basis 3 C	Basis 3 D
Cost of Reproduction of Physical Property, as Estimated by the Board .....	\$13,560,300	\$81,191,300
Loss of Return during Early Years of Operation .....	1,900,000	6,000,000
 Total.....	 \$78,160,300	 \$90,191,300
Property not to be Supported by Income from Railway Operations .....	101,182	101,182
 New Total.....	 \$74,559,118	 \$89,090,118
Accrued Depreciation.....	46,569,311 <u>16,843,200</u>	49,369,311 <u>7,764,000</u>
 Cost of Reproduction less Accrued Depreciation.....	 \$20,189,807 <u>60,913,918</u>	 \$20,120,807 <u>70,126,118</u>

Mr. Knowles is of the opinion that, in arriving at fair value, consideration should be given to consolidation value and to going concern value, but he makes no addition to cost of reproduction on account of these items.

We believe that if, from any point of view in a consideration of the value of the property, the Company should be penalized for and required to charge off the amount of accrued depreciation of parts, then the Company is justly entitled to enjoy fully the appreciation in value represented by present prices, especially when prices are not expected to revert to former low levels.

#### Other Elements of Value

The developmental value as estimated covers the loss in return upon investment during that early period of operation necessary to develop the traffic, to perfect the operating organization, and to adjust the physical property to smooth and regular operation. The amount of this estimate is as calculated by the Board, and is in effect equivalent to one year's interest on the investment spread over a period of five years.

We conceive the going concern value of this property to be the product of the efforts and expenditures made without reimbursement during the life of the property to preserve it in the service of the public as it is found today. In an estimate of the cost of reproduction, the conditions which surround the physical property, as a result of its history involving expenditure and sacrifice, cannot be assumed to be found ready to hand and free of expense. The best measure of such value is cost, and study of such conditions and expenditures leads to the estimate that the going concern value of this property is at least \$5,000,000 which Mr. Emery adds to the estimated cost of reproduction of the physical property.

Mr. Emery estimates the consolidation value of this property as at least \$6,000,000. It is that value which attaches to a strong, unified system as contrasted with the uneconomical conditions under which smaller companies, often with diverse interests, operate in the same territory.

Traveling public, real estate owners and municipalities participate fully in the value accruing from consolidation. The best measure of this value is arrived at by consideration of its actual cost. The estimate is based upon well authenticated payments to effect the various consolidations leading up to the Pittsburgh Railways Company in excess of the cost of physical property which was acquired. Large additional considerations in stocks and bonds were given for this purpose but were not taken into account in the preparation of this estimate. An authority in support of an allowance for this element of value, is the opinion of Mr. Justice Brewer in the case of the Cleveland, Cincinnati, Chicago & St. Louis Railway vs. Backus, before the United States Supreme Court (154 U. S., 139).

#### **Rate Base**

We believe that, as the cost of reproduction of the property of the Company, in the service of the public, by any fair method of pricing, is well in excess of the actual cash investment made and now in the service of the public, viz., \$65,000,000.00, a rate base to be just to both parties and unjust to neither, should be not less than \$65,000,000.00 and to give some weight to cost of reproduction should range between \$65,000,000.00 and \$10,000,000.00.

#### **Annual Return**

We believe that the annual revenue should provide, at the present time, the sum of \$1,900,000 in excess of operating expenses and taxes out of which \$280,000.00 should be set aside for a contingent expense and tax reserve, \$150,000.00 for a functional depreciation reserve and \$127,000.00 for amortization of abnormal replacements. We consider that the remainder would give a reasonable annual return, at the present time, upon the rate base as fixed by us. We are, however, of the opinion that the amount of money necessary to reproduce the property could not now be obtained for such purpose without a higher expectation of return and that therefore, the Company should be entitled to earn a larger return whenever conditions warrant.

#### **Participation in Economies**

The Public Service Company Law provides that "it shall be lawful for every Public Service Company to participate to such an extent as may be permitted by the Commission and deemed by the Commission wise, in the additional profits afforded by economies, efficiencies or improvements in method or service." In the life of the Pittsburgh Railways Company important and far-reaching improvements, most of them of a pioneer nature, have been made in the car equipment and methods of maintenance. The Company has likewise effected great savings in power production by adopting more efficient equipment as made available by the rapid advance in the art, by the change from direct to alternating current system, and by its contract with the Duquesne Light Company, in which it shares the economies realized from unified operation of power plants, larger units and greater diversity factor.

The annual saving accomplished by these improvements and within the spirit of the law, was calculated for the Board at \$960,000. Upon instructions of the Board a further calculation was made showing the amount which the Company would be entitled if permitted by the Commission to participate, to the extent of 25%. The resulting sum, viz., \$240,000 per year, should be included in the amount of permissible annual return on the Company's investment when the circumstances warrant.

## Estimated Revenue Requirements for 1920

We estimate that the revenue requirements for the calendar year 1920, will be as follows:

	Amount	Per Revenue Passenger
Items of Revenue Requirements agreed upon by Board		
Operating Expenses at Present Wage Rates.....	\$13,186,000	6.10c
Taxes .....	600,000	0.27
Total.....	\$14,086,000	6.37
Other Items of Revenue Requirement		
Contingent Operating Expenses and Taxes.....	280,000	0.13
Amortization of Cost of Abnormal Replacements .....	125,000	0.06
Functional Depreciation.....	150,000	0.07
Available for Return on Rate Base at April 1, 1918.....	1,320,000	1.95
Available for Return on Capital added since April 1, 1918.....	28,000	0.01
Total Other Items.....	\$ 4,905,000	2.22
Total Revenue Requirements.....	\$18,991,000	8.59
Less Revenue Other than Passenger.....	300,000	0.14

Revenue Requirement from Passenger Service at Present Wage Rates .....	\$18,691,000	8.45c
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To this total must be added:

1. Increase in wages over present rate.
2. Return on additions to Capital.

### Contingent Expense

The operating expenses as estimated by the Board are based upon normal operating conditions and would not provide for untoward events such as floods, general conflagrations, unusual accidents or business disturbances. In this connection it should be borne in mind that Pittsburgh is peculiarly sensitive to business depressions. Such events must be considered as almost inevitable in American cities and their cost to electric railway transportation systems is properly spread over a period of years, thus partaking of the nature of an insurance premium. Any accumulations in the reserve fund may be invested in additions to property, and the fund, if such be accumulated, should be subject to reasonable control. There is also considerable doubt as to the amount of taxes and of damages under conditions following reorganization.

A further reason for provision of this reserve is that the operating expenses and the rate of fare to produce the revenue required can only be calculated within certain limits of accuracy, so that in fixing the fare for a period in the future, care must be taken not to make it so low that probable events may render it insufficient.

### Return on New Capital

The allowance for return upon new capital required is at the rate of 8% upon that new capital estimated to be required to the close of the year 1920. It is assumed that the annual increase in traffic will support further additions to property or else they will not be made.

### Amortization of Excess Replacements

The allowance to amortize the cost of excess replacements is sufficient to charge off such excess costs within 10 years. This is a proper revenue requirement in this estimate as a deduction has been made for such excess replacements in the rate base used herein.

### **Functional Depreciation**

The allowance for functional depreciation is to provide a fund against revolutionary changes in the art of urban and suburban transportation which are inevitable in a long period of years. It is certain that some time, be it 10 or 100 years hence, such a change in the art will occur and at such time the investors will be confronted with a complete loss of their property unless such a fund be then in existence. Insurance against this event is therefore a part of the present cost of service. The fund should be subject to reasonable control.

### **Number of Passengers**

In deriving the number of revenue passengers upon which the foregoing figures of cost per passenger are based, allowance is made for estimated loss of traffic due to the necessary increase in rate of fare over that previous to July 31, 1919.

J. A. EMERY,  
MORRIS KNOWLES.



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